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P R I N C I P L E S
OF
DENTAL SURGERY;

EXHIBITING A NEW METHOD OF TREATING

THE DISEASES OF THE TEETH AND GUMS;

ESPECIALLY CALCULATED

TO PROMOTE THEIR HEALTH AND BEAUTY ;

ACCOMPANIED BY A GENERAL VIEW OF

THE PRESENT STATE OF DENTAL SURGERY,

WITH OCCASIONAL REFERENCES

TO THE MORE PREVALENT ABUSES OF THE ART.

IN TWO PARTS.

BY LEONARD KOECKER,

SURGEON DENTIST,

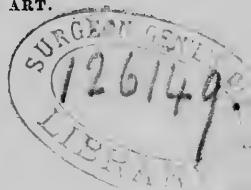
Doctor in Medicine and Surgery ; Member of the Medical and Linnæan Societies ; and
of the Academy of Natural Science of Philadelphia, &c. &c.

B A L T I M O R E :

PUBLISHED BY THE AMERICAN SOCIETY OF DENTAL SURGEONS.

WOODS AND CRANE, PRINTERS.

1842.



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L. Koecker.

Leonard Koecker M.D., D.D., S.

For the American Journal and Library of Dental Science

From a Miniature by Miss Newell

L. tæg. v. på de danske Billeder.

TO

DAVID D. DAVIS, M. D., M. R. S. L.

MEMBER OF THE ROYAL COLLEGES OF PHYSICIANS OF LONDON AND
EDINBURGH;

LATE OBSTETRIC PHYSICIAN TO H. R. H. THE DUCHESS OF KENT;

AUTHOR OF ELEMENTS OF OPERATIVE MIDWIFERY;

&C. &C: &C.

MY DEAR SIR—

THE friendly reception I met with at your hands on my arrival, an entire stranger in this country, would alone furnish sufficient motives for thus publicly avowing the feelings of gratitude and regard I entertain towards you.

The innumerable obstacles you must have encountered in perfecting the knowledge of the obstetric art, so luminously communicated to the profession, in your late work, must have convinced you of the existence of peculiar difficulties in other departments of medical science. The distinguished success which your uncommon zeal and talents have obtained for you, in surmounting the difficulties which have so long enveloped in obscurity that very important department of your profession, must, moreover, have made you well aware how essentially necessary it is, in addition to a perfect acquaintance with the principles of

general medicine, to devote a deliberate attention to minute details and facts, as well as to other duties too irksome to be performed with sufficient perseverance to insure success, without that degree of zeal which is but rarely manifested, more especially in treating on a subject, which has not yet been considered by the profession with the attention it deserves.

Happy, therefore, in the opportunity of offering this little work, to the profession, under the sanction of your name, I submit, with much diffidence, both its merits, if any, and its demerits, to the decision of public opinion.

Whatever that decision may be, I shall always remain with heartfelt esteem and respect,

My dear sir,

Your most faithful friend, and obliged servant,

LEONARD KOECKER.

P R E F A C E .

HAVING been repeatedly urged and advised by his friends to make public the result of his professional experience, the author, notwithstanding the difficulties under which he is placed, as a stranger in this country, has at length ventured to throw himself upon the indulgence of the English public, and more especially of the medical profession.

As a foreigner, he has no pretensions to talent for authorship, knowing that he is far from being able to write the English language with correctness. His object, therefore, it will soon be evident, is not literary fame ; but the advancement of his profession, in connection with the best interests of humanity. In publishing this manual, he is, moreover, partly influenced by the desire of proving that he is not unworthy of the confidence with which he has been honoured. However unlucky he may occasionally be in his mode of expression, he hopes that he may at least be able to make himself thoroughly understood ; and that, if indeed there be any superiority in his mode of treatment, it will not fail to be discovered and acknowledged.

His original design was intended to embrace an entire system of dental surgery ; but after much deliberate reflection, he discovered that it would require the preparation of several years, especially on the part of a foreigner, to carry such an object into execution. He has been induced, therefore to change his first plan, and to lay before the public only a very concise view, or sketch, of his principles, including, however, some leading points which he considers as improvements.

Should this essay be favourably received, and its imperfections meet with the kind indulgence of the public, he may be encouraged to resume his original plan.

The principles on which he has for many years practised this art, being essentially different from any other hitherto known, and considering those which are commonly received as being founded on superficial views and pernicious errors, he has deemed it useful to give a detail of his peculiar ideas in such a manner as, he trusts, will not only be found to deserve some attention on the part of the professional reader, but also at the same time, calculated to prepare the public mind at large for their reception.

It is obvious, that in proportion as the knowledge of sound and practical principles is diffused and justly appreciated, it will be so much the more easy for the practitioner to insure their general adoption. To gain this point, the author has endeavoured to unite the utmost simplicity of language to the requisite scientific information; and, that he might not fail to make himself intelligible, he has scrupulously avoided all technical terms, as well as every thing else that might have the appearance of scientific mystery.

The cases introduced, were considered indispensably necessary, to give a sufficiently comprehensive view to the reader, of the extent of dental surgery; and, in some measure, to shew the existing difference between the usual dental practice, and that which the author has adopted, almost from the beginning of his professional career. To render them practically useful, and to insure, both to the professional and general reader, much less difficulty in understanding the principles and treatment here propounded, it was necessary to give them at full length.

In conclusion it may be proper to add, that the initials to the American cases, the subjects of which, for the most part reside in small towns, are not those of the respective patients, but are placed in alphabetical order merely to avoid unnecessary repetition.

PRINCIPLES OF DENTAL SURGERY.

PART I.

COMPRISING A GENERAL VIEW OF THE NATURAL HISTORY AND DISEASES
OF THE TEETH AND THEIR RELATIVE PARTS; AND THE MOST APPROPRIATE
METHODS FOR THEIR CURATIVE AND PREVENTIVE MANAGEMENT.

CHAPTER I.

*General Observations on the Present State of Dental Surgery; and the
Development of the Author's Method of Treatment.*

It may be assumed as a fact, that there is no branch of the healing art, so little founded on scientific principles as that of dental surgery.

The practical part of this important department having been so long in the hands of illiterate men, incapable themselves of writing, we have been obliged to depend for our theoretical principles, and for all that was to be learned, otherwise than by practice and experience, upon the information of writers not practically acquainted with the subject. Hence, many pernicious and erroneous theories and opinions have prevailed, owing to the authority which has attached to the names of such persons, while very little substantial and useful scientific knowledge is to be obtained from their writings; and it may justly be said that this science is at present in a great measure destitute of the necessary order and system.

This deficiency frequently places the dentist in the most embarrassing situations; in the absence of proper principles to guide him he will proceed at random, or at best, mechanically; and never be able to profit by his experience, nor to understand the full extent either of his own errors, or the good effects of his remedial indications.

I do not mean to assert that the library of the dentist has not been occasionally enriched with some learned and voluminous works, by certain active members of the profession, both in this country and abroad ; but it is a fact, unfortunately too true, that most of these writings, the more recent not excepted, are greatly characterized by the same defects. They have afforded little or no benefit to practical dentistry, whilst they have contained and advocated innumerable errors, false principles, and malpractices, founded, for the most part, on old prejudices, and deceptive theories. In fact, it seems that the greater part of these productions were much less intended and calculated to promote the welfare of humanity and the profession, than the interest of their authors.

The French particularly deserve our acknowledgments for their industry to increase the stock of our dental literature ; yet they have not produced one original standard work of the natural history of the teeth, similar to those of Hunter, Fox, and Blake, which could furnish them with sufficiently just and solid principles for the innumerable speculations and theories which they have advanced.

This unsettled and vague state of practical Dental Surgery, not only exposes the profession and the unwary public to the errors of the dentist, but it also leaves the greatest opening for the most impudent and ignorant pretenders to assume a profession, which they utterly disgrace, and which they must render a horror to those individuals who are weak-minded enough to become the dupes of their empiricism ; and to measure the merits of a most useful profession by the abuses of incompetent pretenders.

It is a well known fact that there are quacks in every profession, and in every country ; but it cannot be denied that they most particularly abound in the United States of America, and in England. While I say this, however, I also feel it the most pleasing duty to add, that I believe the profession of the dentist to be no where in the hands of more scientific and excellent men, and more appreciated by the enlightened public than in these countries ; a fact of itself sufficient to prove the importance of the profession, and, at the same time, exceedingly creditable to the intelligence of both nations.

No part of that profession which was deemed worthy of the particular attention of a John Hunter, can be a matter of indifference to any people, where the sciences of medicine and surgery are understood ; nor is there any department of it that would not naturally enlist the zealous inquirer, as the importance of the subject to humanity and to science might become better appreciated. The names of Mr. Joseph Fox and Dr. Blake, will immediately occur in confirmation of this statement, men, who by their eminent character have given a dignity to the profession

to which they directed their abilities. To them we are in a great measure indebted for much of that attention which is paid to dental surgery at the present day; and I do hope and believe, that there will not in time to come be wanting others to follow their footsteps. In England and America, where the useful arts and sciences are so highly respected and rewarded, and where distinguished talents, on the part of their professors, are certain of eventual encouragement, there can never be want of such individuals; and although for a time pretension and quackery may glitter in the sunshine of public favour, yet it is to be hoped that the glare can be but of short duration.

Empirics are the natural offspring of the imperfection and novelty of a science. They abound chiefly in the infancy of knowledge, and they are, therefore, more numerous in this branch of surgery, from its being not yet carried to an equal degree of perfection with the other departments of that important art. The proper and most effectual remedy against empiricism, is to be sought in improved knowledge of the principles of the dental art as a branch of surgery, as well as in a general publicity of its abuses. And although it is not against quackery that I have taken the field, yet I deem it my duty to expose it to the utmost, and without any reserve, wherever I shall meet with it. Empiricism is an evil which is not to be overcome by argument, expostulation, or entreaty. Its baneful effects in dentistry are felt not only among the ignorant classes, who are least likely to see this essay, but particularly also among the highest and most opulent members of society.

Dental surgery, as hitherto practised, may be considered as being chiefly founded on empiricism; and while it is doing but common justice to the merits of Hunter, Fox, and Blake, to acknowledge, that in respect to the natural history, anatomy, and physiology of the teeth, very great advances have been made within a few years: it must, however, be acknowledged, that little or nothing has been done by any of those authors, or by any other writer, who has yet appeared, for the pathology and practice of this interesting art.

The present practice in dental surgery is little more than a process by which, at least, once or twice a year, the external appearance of the teeth is a little improved by remedies and operations often more calculated, from their misapplication, to produce diseases of the teeth, than to effect their cure; until, at last, the patient pauses and ceases to consult his dentist, either in consequence of detecting the real cause of his situation, or from totally mistaking it, in consequence of discovering the deception, or of supposing that he has received all the benefit which the art

can afford; thus erroneously ascribing the state of his teeth to other circumstances, sometimes perfectly innocent or imaginary.

Many and various are the painful and distressing consequences of such errors, but not unfrequently a highly valued tooth is lost, and, possibly, afterwards, the loss of some of its immediate neighbours. The patient requests their insertion, and the mechanical dentist now reaps the benefit of his previous labours.

In fact, the present practice of dental surgery at the best is only palliative; it is hardly ever curative, and still less does it operate seasonably as a preventive.

If many diseases present themselves in the case of the same individual, the usual practice is to attend to some one or more of them exclusively, leaving the others to continue their ravages without check or interference. By this procedure, the good effects of incomplete operations, however perfect for their special purposes, are always frustrated in the sequel; for, whenever the causes of a disease are not removed, the disease itself is sure to return; and, besides this, it frequently happens that new maladies and causes of other diseases, are produced by such untimely and injudicious operations; by which, indeed, the ravages of every previously existing disease are greatly aggravated. In fact, this course of partial treatment, which is now so common, is exactly calculated to keep the patient continually under the hands of a dentist, whose proceedings, year after year, are either useless or positively pernicious, until the unfortunate sufferer at length, after losing his teeth, loses also his patience, and refuses any longer to be the subject of unprofitable experiments and palliatives, or resolves to resort to the restorative means in the hands of the mechanical dentist, by far more injurious and destructive than the former.

It is a common occurrence, under the present system, that the operator is not well acquainted with the nature of those diseases which he undertakes to treat. A number of humiliating proofs of this fact might be quoted, if the able men of the profession would take the trouble to record the examples of such cases as have come within their own observation. Where errors, so greatly affecting the health, happiness, and even the life of a human creature, are the result, as they frequently are, of an unpardonable ignorance of the most common principles of medicine and surgery, they call for unqualified reprobation. Indeed, I do not scruple to say, that any man, who pretends to practice this art without a better acquaintance with surgery and medicine than is generally deemed necessary, ought to be made deeply responsible for the consequences of his presumption.

It not unfrequently happens when we are called upon to examine the mouth of a patient, who had been the subject of former operative treatment, that we are able immediately to discover

that little or no regard has been paid to the cause, or causes of the disease, for which the treatment in question had been instituted; but what is yet worse, it is more common to observe, that new morbid causes have been added; or that the mischief of a primary disease, for which an operation was undertaken, has been rather augmented and exasperated, than that any real benefit has been done to the patient. Sometimes, for example, fatiguing and irritating operations are performed during a delicate state of the general health. In all such cases, a considerable aggravation of the general and local maladies, with which the patient may be afflicted, together with an entire failure of the object in view, is the certain result of such injudicious precipitation. It were, indeed, as wise for a physician to prescribe great bodily exertion to a patient under a high fever, as for a dentist to operate at such an unfavourable moment.

We often find that very irritating operations have been performed for the cure of the disorder of some particular teeth; while either the gums, the alveoli, or the periosteum, or the parts of the mouth generally, were in a state of inflammation or suppuration, and, perhaps, at the very time when diseases of these parts were the exciting causes of the diseases in the teeth; a proceeding, indeed, against all sound surgical principles, and, to say the least of it, not likely to be attended with very substantial advantage to the patient.

But one of the greatest and, probably, one of the most mischievous errors, even among dentists of some celebrity, is the common practice of inserting artificial teeth before the mouth has been properly prepared for their reception by being brought into a healthy state.

Artificial teeth, when placed in a diseased or unsound mouth, are a source of great danger, suffering, and additional disease; and yet, in spite of experience, which never fails to prove the truth of this statement to every practitioner who will take the trouble to examine his own cases, operators grow old in the repetition of the same dangerous practice. I have very frequently seen the most alarming and destructive consequences arise from this most injudicious procedure, of which some of the cases contained in this volume furnish the most striking proofs.

What would be thought of a surgeon who should adapt an artificial leg or arm to the stump of a patient before the parts were completely sound? And yet he would not be more reprehensible than the dentist, who inserts his artificial teeth into a diseased mouth. And what would be thought, I would ask, of the oculist, who should insert an artificial eye while the socket was in a state of suppuration or inflammation? Yet the oculist would not be more blameable than the dentist in the instance of the malpractice referred to.

For the honour of human nature, I would hope, that when this is done by any member of my profession, it is done out of ignorance. For to suppose that the operator was fully sensible of the consequences, the great suffering and inevitable destruction to the teeth, and to the general health of the patient, were to suppose him something worse than a deliberate destroyer of his species by secret violence. Yet so very general are examples of this kind, that I do not scruple to say, according to my own belief, founded as it is on much observation, that by far the greater part of the teeth of persons, in that class of society who most frequently consult the dentist, are rather injured than benefitted by his services; and that the greatest part of the maladies of the teeth, and those which are the most difficult to cure, are the result of such injudicious proceedings.

It is in consequence of such treatment, that the most effectual remedial operations, however skilfully performed, are so frequently rendered of little or no avail, or even worse than useless.

Thus it often happens, that teeth, which have been filed, or those from which a decayed part has been cut away without proper attention to the causes of their diseases, as also such as have been improperly stopped, either decay again, or are lost in consequence of inflammation in their nerves, periosteum, or other surrounding parts; the eventual destruction being justly imputable to the untimely and injudicious employ of operative treatment. But these mischievous effects are most conspicuous in the cases of artificial teeth inserted, as I have already mentioned, unseasonably. They are so fatal, and the fact is so universally known, although the causes may not be so generally understood, that it might be considered a thing of course, when the patient has begun the use of artificial teeth, that he must continue it; adding one tooth after another until he has lost all his natural teeth. Thus the introduction of a single artificial tooth is frequently the precursor of the loss of a whole set when inserted in this destructive way.

If such are the consequences of these operations, when skilfully performed, what must be expected to be the results of bungling operators in the same circumstances?

The particular modes in which the several operations of this art are performed at present, and the principles on which their performance is founded, if, indeed, it might be said that any such principles have been established, are, unhappily, extremely vague and imperfect.

It is a peculiar character of almost all the operations of this art, but especially of those on the teeth themselves, to be not calculated to admit, even of mediocrity in their performance. The physiological fact should not be lost sight of, that the same

construction of the bony part of the teeth which makes them the hardest and most durable bones of the whole system, not only renders them incapable of the process of exfoliation, and also of that power by which they might recover from the effects of disease, like other bones, but naturally makes them incapable of recovering from injury inflicted upon them by imperfect or improper operations. Hence the instruments of the dentist should be considered as possessing, although great curative power, a hundred-fold greater power of destruction of the health; and, like certain active poisons, they can only be made curative means by great skill and judgment.

The effects of all the important operations in dental surgery are never passive, but always active in their consequences: they must either assist nature in preserving, or combine with the causes of disease, as a most powerful auxiliary in destroying the health and life of the parts.

Let us only consider one of the most common operations of the art, that of extracting teeth. It is the destruction of very important parts of the human body, and, if injudiciously performed, its destructive consequences not only injure the appearance of the mouth, but also undermine the constitutional health of the subject. While, on the other hand, the removal of diseased and painful teeth, and dead roots, by cautiously and judiciously performed operations, is, frequently, a most powerful and certain remedy, not only for many painful diseases of the mouth and teeth, but also, for the most obstinate diseases of the general system. The stopping of teeth with metal, and the removal of carious parts with the file or other cutting instruments, are also among the most important and most useful operations for the restoration of the health of the teeth; and, if well performed, they may be considered as generally effectual for their preservation during life, and without which, no perfect cure could be obtained. But these operations, if not performed with the greatest judgment and skill, never fail to become themselves causes of diseased actions, and, often, of diseases more rapid in their destruction, and more difficult to cure, than those produced by their natural causes. The manner, however, in which these operations are at present generally performed, seems to be much more calculated to destroy, than either to preserve or to restore the health and beauty of the teeth; and the good effects expected from operations of this kind, are scarcely ever obtained.

Operations on the teeth, with few exceptions, require as much skill, and evolve as much difficulty in their performance, as any of the most important operations of general surgery; an assertion which I trust I may be allowed to make, without detracting from the pre-eminent merits of that excellent art: but the mechanical

part even of dentistry, although far from forming one of its most difficult, or most important departments, is much more complicated and subordinate to pathological judgment, than that of any other branch of general surgery. In treating hereafter, at some length, of a few of the most important, and most common operations of dental surgery, viz: the extraction of teeth, on stopping carious teeth, and so forth; I trust I shall have it in my power to give satisfactory and convincing proofs to the attentive reader of the truth of this assertion; and that I shall be able to establish the fact, that the operative part of dental surgery forms a much more important, and more extensive branch of the healing art, and that its practice is attended with much more difficulty than what I believe to be the general opinion.

If we consider the great importance, the very different and opposite effects of the various dental operations according as they are well or ill-performed, if the actual difficulties just mentioned, are duly estimated, and lastly, if it cannot be denied that, amongst the many practitioners of this art, only a very small number are moderately qualified for the proper performance of its duties; it may be easily supposed that the number of good and useful operations must be very inconsiderable, and, consequently, that the mischief done by unskilful and injudicious operators must be exceedingly great.

In fact, I do not hesitate in the least, to assert it as my sincere opinion, that dental surgery, in the manner in which it is practised at present, is really a great positive evil; and that the benefits derived from it, capable as it is of being made highly useful, and of contributing, importantly, to the preservation and restoration of health and life, are not, by any means, an adequate compensation for the miseries which are inflicted upon the human race by its many imperfections and abuses.

If the poor and ignorant classes of the community so frequently preserve their teeth much longer than their wealthy and more refined neighbours, it is a fact that the former are, generally, only subject to the abuses of one part of this art: viz. the extraction of their painful teeth; whilst the latter are also subject to the malpractices of dental surgery in its most extensive pretensions.

Having thus briefly adverted to the present state of dental surgery in Europe and America, I trust that neither the general reader, nor the scientific dentist, will attribute the apparent severity of my remarks to want of charity or liberality, but to my great anxiety to promote the substantial interests of the profession, and to put a stop, if possible, to the pernicious practices which have so lamentably prevailed, and which are equally destructive of the respectability of the profession, and of the general health of its objects.

I am sorry to observe, that the abuses to which I allude are not confined to the practice of the inferior orders of our body, but that their effects are very frequently to be observed in the practice of dentists, generally considered of the first rank; and not only of those highly esteemed by the public, but also of such as are held of good reputation, even by the medical profession. This conduct seems the more surprising, as some of these gentlemen, from the superior education which they must be supposed to have received, should have been capable of detecting their errors, if they had only taken the trouble of giving the subject sufficient thought, and that attention to which they should feel themselves bound by their professional duty:—yet I believe the attentive perusal of the present volume will suffice, to convince the medical and surgical reader, as well, indeed, as readers in general possessed of clear views, that the statements here made are perfectly just, and well-founded.

In France, where it cannot be denied, that general surgery has made great progress towards the attainment of excellence, the abuses and malpractices of dental surgery here referred to are quite the order of the present day.

In many instances the utmost exertions of some of my patients, whose time did not admit of having their cures completed under my care, to insure the fulfilment of my indications in that country, proved altogether abortive, although they consulted many of the most reputable of the profession, and distinctly expressed their willingness and their wish to undergo any course of treatment, however expensive or protracted, with a view to the attainment of that object.—See Case 7.

I must candidly confess, that when residing at Philadelphia, I indulged considerable hope that in Great Britain, where medicine and surgery have acquired so high a degree towards perfection, and where other useful arts and sciences are so successfully cultivated, I should find the practice of dentistry in a much more advanced state than that in which my experience in that country authorized me to believe it to be: but if I may be permitted to speak openly the truth, I feel myself compelled to say that this hope has not been realized. On the other hand, I have seen many grievous examples of the worst abuses of the art, which have proved to me, that its actual practice has not by any means kept pace with its theory, even in England; I might advance a great number of cases to prove this fact, and to illustrate the particular practice of this country, were it not equally tedious and unnecessary.

The following case, however, I consider myself bound in duty to give that publicity to, which it so eminently deserves, and which will be quite sufficient for the present illustration.

CASE I.

Miss R. a young lay of great respectability residing in Portland Place, consulted me concerning her teeth. She was accompanied by her aunt, who requested my opinion whether any thing could be done for a temporary improvement of the four upper cutting teeth of her niece. This young lady was about fourteen years of age, and her general health was very good. The four incisors in question, were affected with caries of a peculiar character and appearance; several of her molares were also affected with the same disease, which with some irregularity of the under teeth, and a slight accumulation of tartar was the disorder of her mouth.

After a short but minute examination of the case, I refused to do any thing with a view to a temporary improvement; but very decidedly stated, that by a proper treatment, not only the four front teeth, but every other tooth of any importance could be rendered perfectly sound and preserved during life.

The young lady was greatly delighted, and the aunt seemed to be not less forcibly struck by my assertion, but expressed considerably doubt of its practicability; in explanation of which this lady stated that fifteen months previously, when the disease was in a far less advanced state, four of the most fashionable dentists in this metropolis had been consulted, and every one of them had positively declared that nothing could be done to prevent the loss of the upper incisor teeth, and that the only remedy in their power was the cutting away of the diseased, and the insertion of artificial teeth.

Much surprised at this statement, I repeated my assertion, and promised that in less than two months every part of her mouth should be rendered perfectly and permanently sound by the plan of treatment I should propose.

This treatment was immediately acceded to, and applied in the following manner.

September 24th, 1825.—Three teeth, viz. one small and two large grinders of the under jaw, which were either carious or acting as a cause of irregularity, were extracted with a view to produce healthy action, and to afford facility to nature gradually to remove the irregularity of the under teeth.

October 5th.—The teeth were scaled and perfectly cleaned, and the patient was provided with the necessary means of observing a perfect cleanliness of the mouth.

October 13th.—The external caries was cut away from two of the upper incisors, the deep seated caries extirpated, and the cavities stopped with gold on the interior surface of the teeth.

October 17th.—The caries was removed from two upper cut-

ting teeth by the file and cutters, and the two other teeth were rendered sound by filing only.

October 24th.—Nine teeth were filed with a view to remove either superficial caries or some irregularity.

October 31st.—The caries was extirpated from two of the molar teeth, and the cavities were plugged with gold.

By the above treatment, all the teeth and parts connected with them were rendered completely sound, and their natural form and beauty perfectly restored within thirty-seven days, to the great gratification of the young lady and her parents.

Had the plan proposed by the gentlemen previously consulted been adopted, this young lady would, in all probability, before the age of fifty, have lost every tooth in her mouth, and required a whole artificial set, and thus have been made a most profitable patient to the ignorant dentist, and an object of misery to herself, unless, indeed, the painful and destructive effects of such treatment, and diseases accompanying the gradual loss of the teeth, might have so much impaired her general health as to cause her premature death.

In the United States of America, although little or nothing has been done in the way of publishing upon the subject of dental surgery, yet I feel myself authorized to say, that in no part of the world has this art attained a more elevated station.

The operative part is by far more extensively cultivated, and has arrived at a state of excellence much greater in that than in any other country to my knowledge, but unfortunately this superiority is only to be found in the practice of a very limited number of men of talents and principles; while the practice of the greater number differs in no way materially from the description I have already given of that of other countries in general; and as the professional officers of this art are much more frequently in demand in America than in Europe, we may reasonably enough infer that upon the whole it is also much more frequently abused there than in any other part of the world. In proportion as the demands for the assistance of this art have been multiplied, and its opportunities have furnished the means to the skilful and well-informed practitioner of doing much good, in the same proportion has it enabled the unskilful and the impostor to inflict misery; and, instead of preserving diseased teeth, to effect the eventual destruction of those that are sound. I believe no part of the world suffers more from clumsy imitations of the best dental operations than America. This will be seen in several of the American cases dispersed through this volume.

In Germany, Russia, Holland, Portugal, Spain, and Italy, dental surgery is far less advanced than in any of the countries already mentioned; and, in some of these, as far as I am able to judge,

there is scarcely any substantially useful part of it at present sufficiently known. So long as its practice is almost exclusively in the hands of illiterate men, and not less frequently monopolized by the most unprincipled intruders, so long must distrust of its power, and prejudices against its just and well-founded pretensions form a barrier against its progress and improvement.

During my last visit to Germany, in 1823, I made the painful observation, that all my friends and relatives, without exception, who had sought the assistance of the dentist, for any other purpose than that of the extraction of a painful tooth, had been most grievously injured, and that none of them had derived any benefit from it whatever: although some of them, whose cases I shall particularly relate, had received the attention of men whose names were loaded with high sounding titles.

CASE II.

One of my nearest relatives, a lady whom I had left fourteen years previously in an excellent state of general health, with a fine and almost a complete set of teeth, I found again, at the age of forty, in possession of only seven of her natural teeth, but with a number of dead roots, and a few most miserable artificial teeth in addition, which were only calculated to destroy her few remaining teeth, and increase the injury already suffered by her general health. The remaining teeth were scattered about in different parts of the mouth, and from the injudicious treatment which they had received, and from the omission of that proper treatment which they required, they were in such a state of disease, that I could only preserve them with the greatest difficulty and exertion. They were, however, restored to health, and her general constitution happily recovered its former vigour.

CASE III.

Another lady, distantly related to me, was most grievously suffering from the effects of an extremely diseased mouth, occasioned by the rude ignorance of her dentist. She was, a few years previously, as much from her good and amiable qualities, as from her accomplishments and personal beauty, the idol and the favourite of the best circle of the town in which she lived; and now, from the insertion of many artificial teeth, in the usual manner, had lost all her natural teeth, of which she had remaining a mouth full of carious stumps, and dead fragments. Her situation had such a distressing effect upon her, both as to mind and body, as to produce great despondency, and almost total failure of spirits. She suffered much from disorder of her digestive organs, attended by general debility and emaciation; indeed, so much so, that she was not only rendered personally wretched,

almost to despair, but she became an object of the most serious apprehension to a fond husband, and most affectionate family. Her case excited my interest and sympathy so much, that I shall never cease to regret the unfortunate circumstance of my having been unable to afford her the assistance which I wished, and by which she might have been restored to perfect health, in consequence of my being only a temporary visitor of the place in which she resided, and not having with me the necessary apparatus for her proper treatment.

CASE IV.

A lady of my acquaintance, of the principality of Minden, in Germany, who had placed herself under the hands of one of those ignorant dentists, whose talents are chiefly directed to the insertion of artificial teeth, was actually destroyed by his improper treatment.

He inserted an artificial tooth on one of the roots of the cuspid or eye teeth, which, in consequence of the great irritation occasioned by this injudiciously applied operation, produced first a gum-boil, and afterwards a fistulous abscess, which, in process of time, became cancerous. In the course of some years, the unfortunate lady lost her nose and the greater part of her face, and thus became an object of the greatest distress to herself, and to her dearest friends, whilst she was afflicted all the time with the severe suffering incident to so terrible a disease; until at length she was happily relieved by death.

It is a singular fact, the statement of which seems not to be out of place here, that at Rome, in its day, the emporium of the arts and sciences, where dental surgery was, at that period of its grandeur, not only known, but in a state of some advancement, there does not now reside, if I am not greatly misinformed, even one dentist of deserved eminence in his profession.

After the above observations, it will be quite unnecessary to say any more as to the state of this art in Italy, or in those other countries of the continent of Europe, not yet particularly referred to, than to add the remark, that it is a very fortunate circumstance that dental surgery is not so commonly resorted to in those countries, as in England, America, and France. It is, however, to be observed, that it is almost exclusively left to the higher classes of society in those countries, and to the most delicate individuals of them, especially women and children, who are naturally most liable to become sufferers from the injuries which such malpractices are calculated to inflict.

In drawing the foregoing picture of the present state of the dental practice, it has been my aim, not so much to please, as to give a true and just picture of the subject. It is not, indeed, a flattering portrait, nor was it intended to be one; but I believe,

and I sincerely regret, it is a likeness, unfortunately too true to the facts of the case.

In this country, my acquaintance with my professional brethren is rather limited; but I have that opinion of their talents and temper, which encourages me to say what is true, however unpleasant it may be, so long as it can be of use to the profession.

The truth is, that in order to make our common profession respected, we want nothing but that union and co-operation among ourselves, which have made surgery and medicine so respectable. The effects of such a cordial co-operation among its intelligent, and justly respectable members, each contributing his utmost to the general stock of experience, would soon demonstrate the difference between science and quackery, sound practical knowledge and pretension, so clearly, that the very multitude would be capable of distinguishing the empiric from the well-informed practitioner.

When I entered upon my professional career in the United States of America, upwards of fourteen years ago, I was forcibly struck with the paucity of assistance to be derived from books: for although, I was well acquainted with the practice of Germany, and also in possession of all that could be obtained from the French and English writers, I found that I knew, comparatively, but little of my profession, as a branch of medical and surgical science. It could not escape my observation, that diseases of the teeth were much more common in America than in any part of Europe, and that they were infinitely more rapid in their destructive progress: at the same time, healthy and beautiful teeth are much more highly valued by the inhabitants of that country, than by those of any other. For these reasons, I found it necessary to undertake a more elaborate and comprehensive examination of the subject than I should probably have done in any other part of the globe. It was necessary, almost entirely to abandon the usual modes of practice, and to found my treatment upon well-established medical and surgical principles.

Among many cases which came under my notice, there were some which were well calculated to excite in me no little disgust for my profession, whilst the many painful diseases and miseries, which were inflicted upon the deluded subjects of injudicious, unnecessary, and cruel operations which I witnessed, were of a nature to engage my most heartfelt sympathies.

With a view of shewing what were the common malpractices of that period and country, it may not be out of place to relate here, very briefly, the first, though far from being the worst, case which came under my care among many others of a similar nature.

CASE V.

Miss D. a beautiful young lady, of great respectability and fortune, a native of Lancaster, in Pennsylvania, to whom I was introduced for the purpose of a consultation with the late celebrated Dr. Kuhn, of that place, in the year 1811, was about nineteen years of age, and when I first saw her she was in a pitiable condition; the consequence of an injudicious dental treatment. She had lost the left upper central incisor, and on the remaining roots an artificial tooth had been ingrafted, some years previously, in a very clumsy manner, and, as it seemed from the general state of her mouth, without any proper regard for the diseased state of the remaining teeth and gums; the consequence of which was, the absorption of the whole socket, and a considerable part of the maxillary bone nearest to the root containing the artificial tooth. The effect upon the appearance of her mouth was precisely like that which is produced by a hare-lip, consequently her enunciation was greatly interrupted and injured. This deformity became the more visible and conspicuous from a certain natural conformation of her mouth, by which, when opening it for speaking or laughing, not only her teeth, but also her gums, came to full view: this rendered her case the more deserving of sympathy, as her personal beauty, in other respects, and her amiable qualities, commanded the greatest admiration. For my own part, whilst I could not help admiring nature's generosity, I was most painfully struck with man's rudeness, and destructive ignorance.

On examining the root on which the artificial tooth had been ingrafted, I found that it was split into two equal parts, and that the lower ends of each of these parts were almost one inch apart. All the other teeth, but particularly her front teeth, had become much affected by the general unhealthy action of the mouth, which was labouring under various diseases; many teeth were already lost, and others that were dead, as well as some roots, were necessarily extracted, to relieve her from actual pain, and the morbid effects occasioned by their presence with diseased actions of the gums, sockets, and maxillary bones.

By the utmost exertions, and the best treatment in my power, I had the happiness to see her general health greatly improved, and to restore her mouth and teeth to perfect order.

In my native country I had paid special attention to this art as a favourite study, and though I was full of that enthusiasm in its favour, which the French call so expressively "*l'amour de notre etat*," when I saw the abuses to which it was subjected, there were times when I should have laid it aside for almost any other occupation. I met, indeed, about the same time, with

several cases so exceedingly exasperated by the destructive practices of empirics, that had it not been for the hope which I fondly indulged of being eventually useful in my profession, and, peradventure, of becoming competent to make it more worthy of the public confidence, I should have been driven by disgust and indignation from its pursuit as a permanent employment.

But I am happy that this feeling was not of long duration; I soon found that there was a great degree of certainty in the judicious operations of the art, and by taking care to proceed cautiously, never to repeat an error that I had once committed, and never to fall into the same mistakes which I saw committed by others, I began to feel that I was gaining ground every day in a systematic arrangement of principles and facts on which, at a future period, a system of practice might be established of permanent value to the profession. Still, however, I had for a long time no fixed principles of treatment. There were none to be found in the art; and, therefore, whatever might be the success of my treatment, it deserved no other praise than that which men are disposed to award to successful experiments. But, in process of time, these facts and this experience began of themselves to assume the shape of a system; they appeared to have a self-arranging power, so that, without much additional labour, I was able, on reading over the facts and reflecting on the results of my experience, to extract more certain principles on which my later practice might be founded.

I soon became aware of the most remarkable feature of this branch of the healing art, namely, the certainty of effect with which the preventive and curative remedies which it affords may be applied. For, when applied with proper judgment and skill, and agreeably to fixed and well-understood principles, their success, even in the most difficult and complicated cases, may be considered as almost certain; and I was soon convinced that by attention to just principles, the surgeon dentist might be always able to preserve the health, and prevent the diseases of such teeth as are placed under his care at a seasonable time, and to check the ravages of decay and other morbid actions in almost every case.

This certainty of success arises from the natural durability of the structure of the teeth, and from the great regularity of the process of recovery in them, and in the parts connected with them, when properly assisted by art; and it is this certainty which has rendered the practice of the dentist, perfectly aware as I am of its utility and importance, so gratifying and interesting to me. The cure in almost every imaginable case which may come under the examination of a dentist is, in truth, so little dependent upon unforeseen contingencies, that it might be assumed to bear an

almost direct proportion to the skill and judgment of the operator. If he do all that the art is equal to, there will be generally little or nothing to apprehend in the most desperate or distressing cases.

As long, however, as practitioners in general have only their own experience to guide them, and as long as individuals endeavour to benefit themselves by pretending to the possession of certain mighty secrets or patent improvements, which are withheld from the profession at large, and therefore placed beyond the reach of its just and deliberate appreciation; as long as abuses of this kind are in the least encouraged, and not discountenanced and opposed by the profession of medicine and by the influential part of the general community, so long must dental surgery be an art of experiment and conjecture, rather than of settled principles and well-established efficiency.

But as soon as the respectable professors of this art shall begin to communicate more freely to each other, and to the world, the fruits of their experience, it will be proved that this business is capable of systematic arrangement; and that it has two great and important objects in view, both of which it will then more easily and with more certainty accomplish: namely, first, the cure of the diseases of the mouth, and the prevention of the recurrence of them: and, secondly, so to operate by an early suitable attention to the teeth, particularly those of children, as to prevent, in a great measure, the necessity of much curative treatment in the after part of life.

The objects, therefore, are, cure and prevention. For a time, the curative remedies will be more in request, because of the extreme imperfection of the art, and from the great difficulty of eradicating from the mind of the public those erroneous prejudices which exist in favour of the old and long-adopted practice, and of making them sufficiently well acquainted with the superiority of any new methods. But in proportion as a sound practical knowledge is more generally diffused amongst the liberal and scientific professors of the art, and sought for by the public at large, in that proportion, it is to be hoped, will the preventive remedies become more generally and justly valued.

CHAPTER II.

Of the General Principles of Dental Surgery.

DENTAL Surgery is the science of preventing and curing the diseases, and of preserving the health and beauty of the teeth, and of the parts connected with them; including also the judicious remedial treatment of defects, or loss of parts injurious to health,

general appearance and to the power of distinct articulation. The practice of this very useful art should be founded on a solid basis. On such principles as are the result of repeated observations, and carefully and deliberately examined facts, of a thorough acquaintance with the present state of dental surgery, with the theories and modes generally adopted for its practice, and an attentive and minute examination of their good and bad effects; followed by a total rejection of all false and pernicious theories and practices, by corrections and improvements made upon such as are defective, and the addition of such as are wanting.

To obtain this important object, the following materials are indispensably necessary, and require the most attentive consideration: viz. a minute as well as comprehensive knowledge.

1st. Of the natural history of the teeth and their relative parts; that is, of the gradual formation, and various structures and functions, at different periods of life, of the teeth, the gums, the sockets, the periosteum, and jaw bones in their healthy state.

2nd. Of the different diseases to which the teeth and their relative parts are subjected, their symptoms, together with their remote as well as proximate causes, at the different periods and stages of their formation and structure.

3rd. Of the connexions, sympathies, and influences of the teeth, the gums, the sockets, the periosteum, and the maxillary bones, generally and individually, one upon another in their sound and morbid state; and particularly those of the first set upon the permanent teeth.

4th. Of the influences and effects of those parts in their healthy and diseased states, as well as of those of the whole constitution when in health, or when labouring under any general or local disorder upon the teeth, and the other parts immediately connected with them, at different periods of their formation and structure.

5th. Of the various medical and surgical remedies which the art affords; their judicious exhibition, and the opposite effects produced, as well immediately as permanently, by the application of skilful, or improper treatment.

6th. Of the surgical apparatus and mechanical means for the proper application of the above remedies and operations in dental surgery, added to a general scientific knowledge of mechanism, and the various collateral mechanical arts intimately connected with its practice.

CHAPTER III.

General Remarks on the Natural History of the Teeth and their Relative parts with Pathological Observations.

To give a comprehensive view of this interesting subject would far exceed the limits of this essay. I must therefore confine myself to such general remarks as are immediately subservient to the present inquiry ; and beg to refer the reader for a more extended examination of this important study to the works of Messrs. Hunter, Blake, and Fox, on the Nat. Hist. &c. of the Teeth.

The formation of the jaw bones, the sockets, the periosteum, and the gums, commences when the foetus begins to assume some form, and proceeds with the other bones and soft parts to the completion of their respective structures.

These parts are formed, generally speaking, in the same manner as other bones and structures of the animal body. The teeth, however, are formed in a manner peculiar to themselves, and differ from other bones, being originally a soft pulpy substance of the same shape as the body of the future tooth.

From this pulp the bone of the tooth is first formed, commencing at the cutting surface of the crown of every tooth, and gradually extending its ossification to the other sides of the body, and next to the root and fangs.

The pulp from which the bony parts of the tooth are formed is surrounded by an investing membrane, which is closely attached to the gums. From this membrane, after the formation of the bony structure of the crown, the crystalline covering of the tooth which is called enamel is deposited.

The formation of the temporary teeth commences about five or six months before birth, and is generally completed at the age of two or three years.

Every tooth of the first set requires from one to two years for its complete formation and protrusion through the gums.

The formation of the permanent teeth commences immediately after birth, and is generally accomplished at the age of between twenty and thirty.

Every tooth of the second set requires from six to eight years for its formation and protrusion through the gums.

From the rudiments of the temporary teeth those of the permanent are formed. At an early period of their formation both are firmly and closely attached to one another, and contained in the same socket ; but as they advance in their growth the sockets become enlarged, a separation of the pulps, and a division of the sockets take place, and a separate socket is formed for both. In this state they remain intimately connected by the means of their membranes and the gums.

From a due consideration of this fact the great sympathy and influence between the first and second set of the teeth become perfectly evident. A fact requiring a very comprehensive consideration in the treatment of children on the shedding of their teeth.

At the age of six or seven, the mouth of the child which has not lost any teeth contains twenty, the whole temporary set, and twenty-eight of the permanent; in all forty-eight teeth, in a more or less advanced state, either lodged within the gums, or already protruded.

Soon after the complete protrusion of the first set, and in proportion as the permanent teeth are advancing in their growth, absorption of the fangs of the temporary teeth takes place, and at the age of six or seven the shedding of them generally commences.

This process occupies about five or six years, and soon after its completion, the permanent teeth are observed to have passed the gums, the wisdom teeth excepted.

When perfectly completed, and in a healthy state, the teeth are the most durable parts of the whole system. Their bony parts are the hardest and least sensible of all bony structures.

They are, moreover, protected against external injuries by the enamel, which forms an almost indestructible and perfectly insensible covering.

The teeth have a cavity very nearly of the same form with the teeth themselves, but of a more diminutive size. This cavity contracts more and more with the age of the individual. The purpose of this cavity is to contain the lining membrane of the tooth.

This membrane consists of a nerve, an artery, a vein, and, most probably, of some absorbent vessels. This nerve seems to be particularly intended for an internal protection to the tooth against general morbid influences, and, for this reason, it appears to be possessed of the most exquisite sensibility.

By means of these nervous branches, the teeth are connected immediately with the fifth pair of nerves, and through it with the whole nervous system.

The lining membrane of the teeth distributes its arterial fibres throughout the whole of their bony structure, and thus becomes the immediate means of nutriment to them, as the nerves are of sensibility.

The health and vitality of the teeth depend almost altogether upon their membrane, and if the life of this membrane be destroyed, the tooth will become not only extraneous, but a noxious body. Notwithstanding, therefore, that the teeth consist of the hardest and most solid bony texture, they are, nevertheless, organized, vascular, and interwoven with nervous and arterial fibres.

In consequence of this organization of the teeth, this bony structure becomes subject to influences from the state of the general health like other bones; in greater or less degrees, however, according to the amount of these constitutional influences determined to them, as will be more particularly explained hereafter.

These parts must also be naturally possessed of so much restorative power as their peculiar structure can be supposed to permit, although, from their greater density, it must evidently be comparatively much less than that possessed by other bones.

The teeth are subject to idiopathic and symptomatic morbid actions, and as long as the inflammation is a general affection of the tooth, as long, for instance, as no destruction or mortification in the soft part of the tooth has been produced, so long may it be supposed that the teeth possess a sufficient power of recovery.

The exceedingly hard and dense structure of the teeth has made it impossible for these parts to be gifted by nature with a sufficient degree of vitality to undergo that action by which the process of exfoliation and granulation are produced in other bones; and hence an abscess or mortification, or any other idiopathic disease of the bony parts of the teeth, can only be arrested in its progress by art; viz. by removing the general and local exciting causes, and by extirpating the proximate cause, the dead or diseased parts, by some artificial means.

There is a remarkable degree of nervous sympathy, as well as arterial connexion between all the teeth, but particularly between the several pairs and their opposite corresponding pairs in the two jaws, and also between the immediate neighbouring teeth. In consequence of this sympathy, it often happens when a single tooth is painful, that the whole side of that jaw is affected, and sometimes even the opposite side of the same jaw; whilst frequently, at other times, all the teeth and gums are painfully affected.

This nervous and arterial relation not only exist between the teeth themselves, but also between all the parts connected with them. If, for instance, the socket of one tooth be affected with disease, a certain degree of consent takes place in all the other sockets; and, in many instances, particular disease makes its appearance, at first in one small part only, whence it soon extends, in consequence of this sympathy, over all the alveolar processes. This frequently takes place in some destructive diseases of the gums and sockets.

The same sympathy and connexion are also particularly observed between the teeth and their relative parts. The periosteum, alveoli, and the gums are parts essentially belonging to the teeth, a fact sufficiently proved by the circumstance that, when a tooth is lost by disease or extraction, these parts become of no use

whatever, and, consequently, are removed by the natural process of absorption.

There is, indeed, a great extent of sympathy and connexion amongst all the teeth and all these parts, and if one of them is affected, the irritation must, in every case, be extended over all the other parts; although this may be generally observed only in an advanced state of the disease. Thus, for instance, when the lining membrane of one tooth is in a state of violent inflammation, and producing a fit of the tooth-ache, not only the nerves of all the other teeth are more or less symptomatically affected, but the morbid irritation is also first communicated to the periosteum, and, from thence, successively to the alveoli and the gums, and *vice versa*, if the gums or any other part be primarily affected to an equal extent.

From the peculiar structure, added to the influences of these connexions of the bony parts of the teeth, it naturally follows that no individual part can be considered perfectly safe so long as any other part is in a state of disease. Although the maladies of the bony structure of the teeth may have for a long time no visible effect upon the other parts, as will be explained hereafter, yet so long as there is a single tooth left in a diseased state, or any single part is not restored to perfect health, no absolute cure is capable of being effected, and a certain relapse may, sooner or later, be regarded as unavoidable, however trivial may be the nature of the disorder.

CHAPTER IV.

General Remarks on the Diseases of the Teeth and their Relative Parts.

FROM their natural history it seems to be evident that nature has destined the teeth to live and to die only with the general constitution of the subject, as they generally do with those animals of the brute kind which are not under the influence of man, and, consequently, not exposed to the same morbid causes which generally are the origin of the loss and destruction of the human teeth.

The present luxurious habits of man, and his artificial modes of living, however, inasmuch as they elevate him to the highest summit of perfection in the universal creation, they also lead to the greatest physical and moral vicissitudes, and, not unfrequently, tend to injure, and even to destroy the health and life of the teeth, which, at all events, must be considered as an example of nature's perfect and most precious works of utility and beauty; and, in common with the entire constitution of man, the teeth are obliged,

notwithstanding the remarkable liberality with which they have been endowed by nature with health and strength, to yield to the many causes which so frequently injure and destroy them.

The more perfectly nature has fitted the teeth by hardness and density of structure for their intended functions, and the better they are calculated to resist the destructive influences of all general and local causes in their perfect and sound state, by the very slight sensibility and uncommon durability of their bony structure, added to the great arterial activity, and nervous susceptibility of their lining membrane; the more are they unfitted for the recovery of their health, when it is once impaired by actual disease, by those peculiar attributes of their structure: and it naturally follows that the gums, sockets, and periosteum, which are particularly connected with the teeth, as well as with the constitution, and almost entirely dependent on the state of health of both, must naturally suffer from the destructive influences of both these local and general causes in the same proportion with the parts for the support and existence of which they are exclusively destined.

If it be true that the teeth are liable to be influenced by morbid causes, notwithstanding the peculiarity of their structure, and their physiological advantages, and that they are subject to disease during their strong and perfect state of maturity which they certainly sometimes are; it naturally follows that they are much more liable to such diseases during their premature state; and that they are so liable, more or less, in proportion to the greater or less advancement of their formation and perfection. A fact, sufficiently proved by a minute examination of the individual maladies to which the teeth are subject, as well as by many circumstances and morbid phenomena accompanying them, for which we can account only by recognizing the same fact: viz. the frequent occurrence of a perfect set of teeth retained even till a late period of life by the delicate and weak, and very defective and diseased teeth and gums by the apparently healthy and robust individual; as also certain deformities, defects, and diseases almost always affecting the teeth by their respective pairs, the origin of which might generally be traced to their early formation.

If we see, for instance, an individual, after the age of thirty years in a most delicate state of health with a beautiful and perfect set of teeth, we may safely infer from this fact, and, indeed, generally find that nature had originally given him a good constitution, and that, at an early period of life, he was not suffering from any disease of consequence; but that some latter causes or accidents must have impaired his naturally good constitution.

If, again, we observe an individual of a very robust constitution, possessed of a very diseased set of teeth, we may also frequently find that, at an early period of life, he must have been the subject

of constitutional disorder, to the influence of which should be ascribed the actual imperfections or diseased state of his teeth. In these instances, however, much greater circumspection is requisite than in the former, inasmuch as no positive conclusion could be drawn, and no prognosis should be made, before we have previously ascertained the actual fact, that the diseased state of the mouth is not the effect of some mechanical or chemical cause or causes of disease, such as accidental violence, injudicious operations, or other malpractices of incompetent dentists.

In such instances, where teeth are suffering, or affected with caries, or other diseases or deformity by pairs, while we find other pairs in a healthy state, we may generally with justice suppose that, at the early formation of the diseased pairs, the individual was suffering from some general disorder, while, during the progressive growth of the healthy pairs, good health was enjoyed.

Taking it, then, for granted that the more the teeth are in their early state of formation, the more must they be influenced by any disorder of the system generally, and by those of the mouth, or of the parts which are immediately connected with them; and considering that the formation of the temporary or first set of teeth commences two or three months before birth, and which is generally completed at the age of three years; that during all this time the original health and strength of the teeth are entirely dependent upon the general state of the health of the child; and that the formation of the permanent set of teeth commences immediately after birth, and is generally completed at the age of between twenty-five and thirty years, during the whole of which time this process of nature is either more or less promoted or counteracted and interrupted by innumerable general constitutional causes; it is most natural that the teeth should be very subject to diseases.

But if we recollect also how much the teeth and their relative parts are subjected to morbid actions from many external and local causes, and particularly how greatly they are influenced by the various morbid affections of the parts with which they are reciprocally connected; not forgetting the mechanical and chemical causes of diseases which the first set of teeth are apt to produce upon the second during the excitement of dentition: if we bear in mind also that the teeth are not endowed with the same power of recovery from the effects of disease, which other bones in a great measure possess, as the decay and death of one tooth only may in time operate as a cause of destruction to a whole set: I say, if we duly consider all these facts, we cannot certainly be surprised to find the diseases of the teeth and gums not only exceedingly common, but even more frequently to be met with than any other disorder to which the human frame is subject.

The diseases of the teeth and the parts connected with them are not many, and the judicious management of them is not ren-

dered difficult so much by their number as by their great varieties of situation, character, and stages, and a multitude of other perplexing circumstances which obstinately resist their curative as well as preventive treatment.

It is not my intention to treat particularly of the maladies of the teeth and gums in this part of the essay, as it would not be consistent with my present object which is rather that of inquiry into general principles of treatment; but I deem it necessary to give, in the second part of this book, such views of a few of the most common diseases as I believe to be the most rational; and more especially of such diseases as have been hitherto either in a great measure misrepresented, or altogether considered incurable, viz. of caries of the teeth, and of the absorption of the gums and alveolar processes.

CHAPTER V.

A General View of the Causes of the Diseases of the Teeth and their Relative Parts, with their Mode of Action.

THE causes of the diseases of the teeth and the gums, periosteum, alveoli, and maxillary bones are either general or local; that is, such as affect the system generally, and the mouth and the above mentioned parts indirectly, or such as affect the latter in a direct manner, and the former as an indirect consequence.

Of the General Causes, and their Morbid Effects upon the Teeth and Gums.

Of constitutional diseases.—All constitutional diseases, and such local maladies of the more important organs as affect the whole system, and through it individual parts, must be presumed to extend their morbid influence to the teeth as well as the gums.

But upon further consideration it will also appear, that in consequence of the intimate sympathy subsisting between the teeth, supplied as they are with nerves of extreme sensibility, and with arteries at least not less irritable than arteries in other parts of the body, and the general system, that the diseases of the latter must be productive of more extensive effects upon the former, than upon other parts generally, especially when already affected by local disorder. This fact has been proved to me beyond any doubt by repeated observations and long experience.

During the presence of a constitutional disease, I have frequently observed that it has been accompanied by acute inflammation in the teeth, which not only extends to the blood-vessels of their lining membrane, but also to their bony structure; at such

times, a considerable change takes place in their appearance, accompanied by a corresponding change in the appearance of the gums. This can only be observed with sufficient accuracy in the sound teeth of such persons as have kept their teeth constantly clean, previously to the accession of the general diseases.

It is difficult to describe, very distinctly, the different and very nice shades of appearances of the teeth, and gums under such circumstances, as they are only visible on inspection to the acute and experienced observer. The patient, however, can himself generally feel some certain changes in them, or some sensation depending upon debility, and possibly some soreness affecting them. An analogous sensation is experienced in the gums and surrounding parts, which usually exhibit either an unnatural degree of redness, or considerable paleness. The teeth lose that transparency which they have in a healthy state; and in chronic diseases they will be generally observed to assume a pale, or milky-bluish appearance, and become more or less opaque, while in acute fever they assume an inclination to a reddish hue.

When the teeth had been previously in a perfectly healthy state, and when the other parts of the mouth had been free from local diseases, I have observed these changes in them particularly evident under the circumstances of general disorder of the system; not only the gums, but also the teeth, have shewn particular symptoms of fever.

After death from violent fever, I have found the blood in the blood-vessels of the lining membrane of the teeth sometimes very dark; so that the external appearance of the teeth was quite red; and at other times, great parts of the bony structure had also turned considerably red, from the great injection of the blood, and from its coagulation in the minute vessels of these parts; which by maceration during two to three months, I could not succeed wholly to extract.

If the patient has recovered without having become the subject of much derangement in the functions of the digestive organs, the bony parts of the teeth have almost invariably recovered their natural health soon after the restoration of general health and strength, without having sustained any material injury, nor any other unpleasant consequences than a small deposit of tartar on their external surfaces. But if the general malady have been of long duration, if the use of much medicine have been found requisite, the stomach in the meantime having been much affected, although the teeth might in such a case be expected to recover their health with that of the general system, still there would remain some local causes or other of future diseases, from which they could be freed only by early attention.

In imperfect sets of teeth, some of which had been affected by

caries or other diseases, while the rest had been in a sound state in common with the parts adjacent, the same symptoms appeared in a much greater degree under the influence of general derangement of the frame. The caries was proceeding much faster in those teeth which were previously affected than in the remaining healthy ones, in which there might be observed, either a predisposition to disease, or actual caries. The gums and sockets have been observed to become more or less morbidly affected, and much tartar had been deposited upon the teeth themselves.

But in the mouth which had contained many decayed teeth, and the gums of which were already suffering from previous chronic idiopathic diseases before the general system was affected with an acute disorder, I observed all local maladies of the teeth and of their relative parts to have been much aggravated, the whole mouth to have become extremely tender and painful, and great destruction to be going on in all the relative parts, always accompanied by a great deposit of tartar on the teeth themselves. When a general cure of the acute fever had been effected, the local maladies of the mouth have generally remained, but for the most part, they have changed their character from an acute to a chronic state.

These morbid changes are observed to be the results not only of general fever, but also of diseases of a topical nature, and it may be considered as a rule, that every local disease, no matter what, if it be presumed to affect the whole economy more or less, must be productive of morbid action also in the teeth and their relative parts.

CASE VI.

An American officer, who was wounded in one of his ankles during the last war with England, and in consequence was subjected to several painful operations, found his teeth, during and subsequent to the period of his confinement, decay most rapidly, though they had never before given him any trouble, and had always been, as he believed, perfectly sound and good. I saw that gentleman two years after his accident, and found his mouth in a most deplorably diseased state, with not a single tooth in it perfectly free from disease.

The uncommonly great sympathy existing between the teeth and gums, and the stomach, the liver, and the whole alimentary canal, may be easily observed at any period of disorder in these parts, whether of an acute or chronic nature, and the fact of such a connection, though perhaps not sufficiently attended to, cannot for a moment be doubted.

This may be most frequently observed during inflammation of any particular part of the mouth, either in the teeth or the gums.

For instance, after the lining membrane of the tooth is exposed, it requires a space of time, from one to twelve months, before this membrane is destroyed by chronic inflammation and suppuration. During this time, the patient is always subject to the tooth-ache, or to an acute inflammation of his tooth, capable of being excited by many causes both chemical and mechanical, but obviously more frequently produced by a disordered state of the stomach, and frequently by that of the slightest and most temporary nature. This is still more strikingly evident in the case of a fistulary abscess in the socket and adjacent part of the gum, generally called a gum-boil. This is a local disease, produced by mortification in the socket, and suppuration and inflammation in the periosteum and the gum, originally and proximately occasioned by dead roots or teeth: and, though very small in its external appearance, is an affection of no little importance, it being constantly progressive in its nature, and totally destructive in its event. Gum-boils are more frequently a chronic, than an acute affection, and they generally give so little local pain, that the actual disease is frequently almost totally disregarded by the individual for many years; yet, now and then, it changes from the chronic into the acute form: and the gums, in common with the face, becomes so swollen and painful, that the patient takes it for granted that he is suffering from a paroxysm of the tooth-ache produced by a cold. The real exciting cause will, however, be found much more frequently to be indigestion than the action of cold.

The urinary organs, also, when in a disordered state, very frequently shew a manifest and decided influence on the teeth.

In persons subject to calculous affections, I have generally observed a remarkable tendency to deposition of tartar on the teeth; and I have always found it necessary to use the most powerful means to resist its re-accumulation after it has been most carefully and perfectly removed.

Diseases of the lungs may, also, be observed to be productive of very considerable changes as to the constitution of the teeth and gums.

The prevalent idea that consumptive persons have good teeth, because they are often delicately white, is altogether groundless. These subjects are generally young people, and such as have not lost their front teeth. The diseased action produced in them by the constitutional disorder, gives to them that opaque, pale, or bluish appearance, which has been already described, and is mistaken, by the inexperienced eye, for a symptom of health, while, in reality, it is an indication of a morbid state of the lining membrane. In fact, so far from finding good teeth in such individuals, I have generally found them comparatively defective and diseased.

Of Constitutional Changes.—The natural changes to which the more tender constitutions and peculiar functions of females render them liable, very frequently become active and powerful excitants of the maladies of the teeth, and their relative parts.

During pregnancy, for example, the diseases already existing make a much more rapid progress than at other times, and even new diseases take possession of the sound teeth and gums, in consequence of the increase of excitement produced by such changes.

Hence it is that these combinations of general excitement with the influence of local causes, are so frequently productive during pregnancy, of caries, tooth-ache, and of other powerful diseases and painful symptoms of the teeth and gums.

Thus are we to account for the prevalence of the popular belief that the decay and loss of teeth are natural consequences of child-bearing; and hence, too, the well-known fact, that the tooth-ache itself is sometimes a symptom of pregnancy.

But the truth is, that all these consequences are only to be discovered in delicate and sickly subjects, and in cases where diseased affections of the teeth and their relative parts had been disregarded, and allowed to exist after the accession of these constitutional changes.

Of Diet, or Nourishment.—The manner of living, as to food, has, also, a decided influence upon the teeth, as to their health and diseases.

In the cure of the constitutional, as well as local maladies of the system, and in the preservation of its healthy condition, a judicious diet is an object of the greatest importance, and seems to me to be even more so than is generally supposed. Without wholesome and nourishing diet, a female cannot possibly enjoy that vigour of perfect health which would qualify her to become the mother of healthy children, and which would enable her system to preserve its own health during the period of suckling; nor is it possible that she could supply her child, either before or after birth, with such substantial nourishment as might afford its tender system the necessary degree of vigour for the good and perfect formation of all its animal organs. Without a wholesome and sufficient diet, neither the first nor the permanent set of teeth can acquire a perfectly healthy constitution, either as to function or structure. This will appear more particularly evident, when we consider that, at the time of birth, several of the first set of teeth are already partially formed; and that the formation of the permanent set commences soon after birth: therefore, if wholesome and sufficient nourishment is required for a perfect formation of the teeth, it is very natural that the same is wanted for the preservation of their health, and strength, and requires no further argument.

By the observance of a well-adapted diet, both for mother and child, in a case in my own family, I once succeeded in preventing all those unpleasant, and sometimes distressing symptoms which so frequently accompany the first dentition. All the infant's teeth effected their protrusion through the gums without producing the least pain, or any constitutional disorder.

Of Climate.—Unwholesome climate is, also, one of the most powerful causes of general diseases of the system; and, in the same proportion, an indirect cause of diseases of the teeth and gums.

All those climates which are either extremely hot or cold, and which are subject to great and sudden changes of temperature, must be considered as most unfavourable to the health of the teeth, whilst those countries which are situated under the temperate zones are, undoubtedly, the most favourable to their formation and preservation.

Hence, amongst all the civilized portions of the world, there is, perhaps, none where nature acts more in favour of the health of the teeth than in Italy, for which reason dental surgery is almost entirely unnecessary, and unknown in that country. Hence, also, we find the inhabitants of mountainous countries generally to have the most beautiful teeth; whilst those of marshy and low countries are generally more sickly, and liable to have bad teeth.

Of Medicine.—The use of medicine may, also, be regarded as one of the general causes of diseases of the teeth. At the same time, I would have it understood, that every kind of medicine which is applied judiciously must be beneficial to the system at large, and, consequently, to the individual parts of which it is composed; so that, in this way, medicines which effect the cure of diseases must indirectly operate in curing symptomatic affections of the teeth.

In most cases where such medical treatment is considered to have been destructive to the teeth, I have no doubt that the disease itself, for the cure of which the medicine had been exhibited, would have operated more destructively upon them than the medicine; and that the loss or injury which the teeth may have sustained, ought to be more frequently attributed to the constitutional disease than to the means had recourse to for its removal. Still, however, there are cases where the medicine, which is given for the preservation of health or life, may appear to act directly destructively upon the teeth.

Very powerful medicines, while they thus act in a manner directly injurious to the teeth, often operate at last, and indirectly, as preservatives of them. The injurious effects of most of them, are, in reality, only temporary; and whenever the general disease is removed, they, also, for the most part, disappear; but if they

should continue, their indirectly injurious actions may be rendered harmless by proper attention on the part of the dentist.

The worst consequences that follow diseases which require the use of much and powerful medicines, are chiefly owing to the neglect or want of a timely application of a proper treatment of the teeth and their relative parts, which will invariably be found requisite after every general disease.

In fact, we are authorised in considering all medicines properly administered to be as beneficial to the teeth as they are to the other parts of the animal system. I would not even except the most powerful preparations of mercury, arsenic, acids, &c. when skilfully and judiciously administered.

But these medicines are dangerous weapons in the hands of the ignorant. When we consider how very small is the proportion of medicine which is administered by persons of skill and science; that people are in the habit of prescribing indiscriminately for themselves; if, also, we reflect upon the many abuses to which medicine is subject, by being administered by persons ignorant of some of the most important properties of the drugs which they take upon themselves to prescribe; when we consider the difference which is produced by the best medicines when skilfully administered upon different constitutions, and that when they are unskilfully administered they act rather as poisons than as medicines; there will seem to be neither rashness nor uncharitableness in our attributing a large proportion of the local and general diseases of the system, and, consequently, of the teeth, to the abuse of medicines.

It may, therefore, be laid down as a rule, that all occasional morbid influences which affect the general health must naturally more or less affect the teeth and gums, and that constitutional diseases generally, and especially those of an acute character, must produce morbid actions of some kind or other in the teeth, and all the parts of the mouth closely connected with them.

But from the peculiar structure of the teeth, these general causes will, however, very rarely have sufficient power, by themselves, to produce a permanent disease in a perfectly healthy set of teeth. Nevertheless, they will frequently do so in an indirect manner, if not counteracted by art, by eventually producing diseases of the parts immediately connected with the teeth, such as those of the gums, periosteum, and alveolar processes, tartar, and a vitiated state of the saliva, &c. Sometimes these general diseases may, indeed, become direct causes of diseases of the teeth themselves, and this is often observed to take place in consequence of their being frequently repeated, or their influence being long protracted and especially at periods anterior to the full maturity of these parts.

At the full maturity, therefore, of the teeth, if perfectly sound

and healthy, these general diseases have only limited and temporary effects upon them, because, in that state, they are, from their peculiar structure and the high degree of activity of their lining membrane, eminently qualified to resist such influences. If they are, however, predisposed to disease from the influence of local causes, then a great aggravation of the existing disease, and the accession of new maladies may be considered as natural, and, for the most part, as unavoidable consequences of the constitutional diseases of which we are now speaking.

Thus, while perfectly healthy teeth sometimes for a surprisingly long time resist these morbid influences, those affected by diseased actions of the most trifling importance at other times will suffer a most rapid destruction from the influence of constitutional diseases or other general morbid influences; while during the absence of any such general exciting causes, we may occasionally observe these diseases in the teeth and adjacent parts to proceed so extremely slow as to appear to be totally arrested. Caries, for instance, may not unfrequently be observed to proceed so very slowly as to appear to the inattentive observer as if it were making no progress at all; while, at times, it might be found to advance so very rapidly as, in a very few years, to destroy almost every tooth in the mouth. We can account for this only in the following manner:

In the healthy and robust constitution, which has not suffered from any particular disease; and while the gums are in a perfectly sound state; some few teeth may, nevertheless, be affected with caries, and yet, in consequence of there being no general nor topical causes to aggravate the malady, it may proceed so slowly as to be almost imperceptible. In such a healthy subject, there being neither general nor local exciting causes to produce symptomatic inflammation in the teeth, the whole bony substance retains that healthy action by which the process of the caries is resisted, and sometimes, for a greater or less time, almost totally suspended. The dead matter, also, not being able, either by its mechanical or chemical influence, to produce sufficient inflammation to occasion destruction in the bone; or if we suppose such inflammation produced, but afterwards counteracted by the more powerful healthy action of surrounding parts; the affected teeth, in such a subject, may be preserved by the sanative action of nature in some instances for a number of years, and the progress of the caries almost entirely arrested until again roused into new activity by the accession of some new morbid influence.

If, on the other hand, we suppose the same constitution to be of a delicate kind, and suffering occasionally from general disorder, or temporary morbid influence, even of a slight nature, and if, besides, the gum, periosteum, and sockets of the teeth are in an

unhealthy condition, the bony structure of the teeth is constantly kept in a state of symptomatic inflammation, and this inflammation, in combination with the local irritation of the caries itself, increases the idiopathic inflammation of the diseased part in a most powerful degree, and, in this manner, continues to aggravate the disease, till the caries has penetrated through the crown of the teeth, and produced inflammation and suppuration in the lining membrane, by which the vitality of the affected teeth is destroyed. Besides, after the removal of every general disease, the local causes and maladies produced by such general disorders, in combination with any previously diseased affections of the teeth and their contiguous parts, continue to advance in their destructive progress.

Of the Local Causes, and their Morbid Effects upon the Teeth and Gums.

Of Diseases of the Mouth.—All idiopathic and symptomatic maladies of the mouth form reciprocally the local causes of the diseases of the teeth and their relative parts, viz. those of the maxillary bones, the alveoli, the periosteum, and the gums; moreover, all irregularities of these parts, and the consequent irregular situation of the teeth in them, exert a great influence in the production of diseases of the teeth. Dead roots and teeth, and the diseases and malformations of the teeth themselves, form also, a considerable part of these local causes, and particularly caries, in some measure, may be considered an affection of a contagious nature.

Of Tartar.—Tartar is one of the most frequent causes of diseases in the teeth. It acts directly chemically in the destruction of them; whilst, by its mechanical and irritating influence, it is rendered indirectly more destructive to them, it being one of the most powerful causes of diseases in the gums, periosteum, and the alveoli.

I have seen instances in which whole sets of teeth, of which the greater number were perfectly sound, drop out one after another in consequence of the ravages produced upon their surrounding parts by this morbid incrustation of tartar. It is, in fact, from this cause, that the most healthy people of the poorer and middle classes, even those who enjoy the healthy and salubrious atmosphere of the country not excepted, almost invariably lose their teeth at that period of age, when the digestive organs begin to be less regular in their functions.

Even animals of the brute kind, and particularly domestic animals, are not exempted from the influence of this powerful cause of disease of the gums, and other parts connected with the teeth. Cats, dogs, horses, cows, &c. are all more or less subject to its

formation, as are, also, even those of a wilder nature, as soon as they exchange their naturally wild habits for the comforts of domestic life, and subjection to human power.

I have seen many dogs that had lost all their teeth both from this cause, and the consequent destruction of the gums and sockets, as well as from caries. I once saw a monkey belonging to a gentleman in Philadelphia, whose teeth were covered with tartar; it also had several carious teeth, which produced frequent attacks of the tooth-ache, and, as the owner informed me, the pain attending them was so violent as sometimes to make the poor animal shed tears like a child.

Of the Saliva.—The saliva, when in a degenerated or morbid state, forms likewise an active cause of disease in the teeth, by its permanent chemical influence upon the parts of the mouth generally, as well as by the greater predisposition to the deposit of tartar possessed by this fluid.

Of External Remedies.—Tooth powders, tooth pastes, tinctures, essential oils, and mixtures of all kinds, &c. employed without proper judgment, are so many causes of diseases of the teeth and gums.

All kinds of dental operations, performed either in an injudicious or unskilful manner, even the improper use of tooth brushes and tooth picks not excepted, act like other causes of irritation, and are, consequently, productive of divers diseases of the teeth.

The local causes, whether physical, chemical, or mechanical, almost invariably act in a more direct manner upon one set of these parts than upon all the others. Either they attack first the gums, periosteum, alveoli, and maxillary bones, or the teeth themselves, and in the beginning they produce primary affection upon some one part particularly, while they act in a more indirect way, and less powerfully, upon all the other parts.

Of all the external causes already mentioned, none, however, are more active, and none have a greater and more morbid influence upon all the parts of the mouth than unskilfully performed operations, such as cleansing, scaling, filing, cutting, stopping or plugging, and extracting the teeth; but the most cruel and destructive of all morbid causes which are known in dental surgery, are those recommended by Messrs. Hunter and Fox, and others: viz. of destroying the nerves of the teeth; of replacing a tooth in its socket after its previous extraction, of transplanting teeth from the mouth of one person into that of another, of applying the actual cautery for arresting hæmorrhages from the socket after the extraction of a tooth, of using ligatures for retaining in their places artificial teeth, or such diseased teeth as are loose, or rather the sockets of which are destroyed by diseases; and, lastly, that of inserting artificial teeth without the necessary surgical principles, and great judgment and skill.

These operations not only excite morbid irritation chemically and mechanically, but also actually produce very dangerous diseases of the mouth, as well as considerable morbid actions of the general system. It may be boldly asserted, that an immense proportion of the cases of destroyed teeth, as well as the sufferings inseparable from their destruction, which occur in those classes of society who are most frequently under the management of the dentist, are produced by the various malpractices which are here alluded to.

To show this fact more satisfactorily, we must again take into particular consideration the peculiar construction of the teeth, as well as the parts naturally belonging to them; and we must well observe, that although the teeth by their peculiarly hard structure, are most admirably calculated to resist very strong mechanical and chemical irritations for a considerable time, and to perform the most powerful mechanical offices without much injury, and frequently even to resist the influences of the most violent accidents; the same construction which fits them so well for these offices and momentary violences renders them so much the less calculated to resist, to bear, or to recover from the effects of chemical and mechanical abuses of a more protracted nature.

Thus we may sometimes bite the hardest substance with impunity, while the action is continued only for a short time, whereas the same action protracted would relax the periosteum, loosen considerably the teeth themselves, and greatly alter their natural and mutual positions.

The great advantage of this may be seen, for instance, in the treatment necessary for the cure of deformities or irregularities of the teeth and alveolar processes. Perfect order and regularity may frequently be restored by a judicious application of pressure by ligature, while the greatest disadvantage may be invariably expected to arise from applying ligatures to fasten such teeth as have been rendered loose by inflammation, or other diseased action of their sockets, or contiguous parts.

For the same reason we may sometimes see very powerful acids have no injurious effects upon the teeth, while the constant irritation of a vitiated state of the saliva may gradually produce caries and other diseases in the teeth, and the parts surrounding them.

It is this permanency of influence which renders injudiciously performed operations, and the use of artificial teeth not very skillfully made or fitted, and perhaps fastened with ligatures, so exceedingly injurious to the remaining teeth; not only as far as regards the mechanical effects of these measures, but also on account of the chemical influences which they produce.

It is, indeed, a positive fact and it may be regarded as a general

rule, that in proportion as diseases of the teeth are imputable to the artificial causes above mentioned, the more difficult it is to effect their cure.

Diseases which are the consequences of original defects in teeth, produced by remote constitutional causes, and aggravated by some proximate general or physical causes, such as deformity, malconstruction, and deep-seated caries in the teeth, &c. are almost invariably discovered in the corresponding pairs of teeth, as well as in corresponding parts or portions of them. They really seem to proceed in a certain systematical order, and we may, therefore, acquire a correct pathological diagnostic knowledge of the extent of these maladies, and adopt suitable remedies, and perform adequate operations for their cure.

Diseases produced by natural local causes, however, such as superficial caries in the teeth, inflammations and suppurations in the gums, periosteum, alveoli, and maxillary bones, if they are the effects of tartar, a vitiated state of the saliva, the morbid influences of corroding roots, dead teeth destroyed by disease, or other natural morbid causes, are much more irregular in their progress, as also in the parts which they affect, than those produced by constitutional causes; whilst the surgical treatment which they require is considerably more difficult, and demands more knowledge on the part of the operator, as well as more extensive instrumental resources: yet some degree of order will generally be observed in their gradual morbid extensions.

But all diseases produced by injudicious dental treatment, such as have been just stated, or any other artificial or accidental causes, are entirely destitute of all possible regularity or order in their formation, as well as in their progress. It would be impossible to describe them pathologically or to form an accurate judgment of their extent. Like the havoc produced by warlike weapons they are most destructive, and the most difficult and intricate cases for a proper and judicious treatment, and require the most extensive surgical apparatus, as well as the performance of some of the most difficult operations for their cure.

I have not unfrequently required from ten to forty hours, divided into a number of separate sittings, during a period of from two to four months, to effect a perfect restoration to health of all the teeth remaining, and of other parts of the mouth involved in diseased actions by operations that had been performed with too much facility and in the short space of one or two hours. The great variety of progress incident to such maladies renders it impossible to give any certain description of the amount or extent of the injuries occasioned by them, if art should not interfere; but they are always of great importance, and frequently the principal, if not the sole causes, of the most distressing and dangerous

diseases; of this I have seen innumerable proofs during my own practice. They may sometimes be even the cause of a miserable and premature death.

Although it is evident that nothing can be more injurious or dangerous in dental surgery than the misapplication of these powerful and effectual remedies, yet I am sorry to be compelled, from a regard to truth, to state that these malpractices are so common, that during my practice a very considerable part of the diseases of the teeth, and the parts connected with them, which have come under my care, were evidently produced by such misapplication of the powers of our art; and what is still more to be regretted, the evil occasioned by such abuses is not decreasing, but seems rather to increase with the progress of science and the lapse of time.

In corroboration of the above statements, I beg to refer the reader to many of the cases dispersed through this volume, and to draw his particular attention to the following two: one of which is my own case, having been myself a great sufferer from the abuses of the art. By their perusal it will be seen, that in every instance in which recourse had been had to dental surgery, no benefit whatever, but considerable injury had been sustained by the respective individuals. See Cases, Nos, 1, 2, 3, 4, 5, 7, 8, 9, 11, 14, 17, 20, 22, 27, 31, 32, 33, 35, 36, 37, 39, 40, 42, 43, and 44.

CASE VII.

Mr H. of Philadelphia, a young gentleman of about eighteen years of age, consulted me on the state of his teeth in the year 1818.

He had just returned from college, and was about to depart for France with the intention of finishing his education in the metropolis of that country. His short stay would not allow time for sufficient attention to be then paid to his teeth, and I, therefore, proposed to remove two carious teeth, which had become painful, and were past all hope of restoration, and to leave the subsequent dental treatment of the mouth to some other gentleman.

The mother objected to this proposal, from the erroneous apprehension that her son might suffer inconvenience from going to sea immediately after the operation, expressing at the same time her conviction, that a timely attention to them at Paris would suffice to prevent much mischief.

A judicious treatment of the diseases of the gums was most essential in the first instance. Of the teeth, several of the molares required stopping; and the upper cuspidati and incisors required to have the caries filed and cut away. To obtain these objects, I advised that an application should be made to the most respectable dentist immediately on his arrival at Paris.

During his residence in that city, the young gentleman was frequently reminded by his anxious mother of the importance of paying attention to the directions I had given him concerning his teeth ; but his answers soon confirmed the correctness of my apprehensions, reluctantly expressed before his departure.

He informed his mother that he had applied to several of the most eminent dentists of Paris, but that the complete dental treatment which I had suggested could not be obtained there. Every dentist whom he had consulted, had given him a few sittings and performed some superficial operations ; at the same time assuring him that all had been done that the art could do. Though his own judgment and experience convinced him of the imperfection of such treatment, he was compelled by his sufferings to apply again several times for relief, and to submit to certain operations, in hopes of being relieved ; but finding himself always disappointed, he at last gave up all hopes.

Immediately after his return to America in 1821, I was again consulted.

I found his mouth in a most deplorable condition, and notwithstanding the assurance which I now had from his own lips, that he had been repeatedly under the care of some of the most eminent dentists of Paris, whose names were familiar to me, I should have deemed this account to have been false from the appearance of his teeth ; but from the unquestionable character of the young gentleman, and his abundant means of obtaining assistance of the most competent in such a case, as well as from my own experience in former and similar cases, which fully corroborated his assertion, I had no doubt of the truth of what he said.

The teeth and gums were suffering from the diseases I had observed on the first examination, greatly aggravated, indeed, by neglect ; as well as from some others, which had been generated, partly by the long duration of the maladies previously existing, and partly from the mischievous treatment which had been applied to them. In fact, those teeth, which, from the inconsiderableness of their diseased affections, were intended for preservation, were now in an almost incurable state ; and those which I had advised to be extracted, after much solicitation on the part of the patient, had been reluctantly extracted by the dentist ; but at a period much too late to obtain any beneficial effect from the operation.

The operation of scaling had been performed, but to judge from appearances, very imperfectly. The cuspidati and incisors were filed in so objectionable a manner, that a great proportion of the stronger parts of the bony structure had been filed away, without removing the carious parts : and it became a matter of the greatest difficulty to preserve the remaining parts of the teeth by plugging them with gold.

No attention had been paid to the carious molares which required stopping. These and the front teeth, from their diseased state, as well as from the irritation produced by the injudicious filing which had been made use of, were rapidly decaying, and had not yet recovered from a state of extreme tenderness consequent to that operation; so that it was become impossible to keep them clean.

The two first under, and the two second upper large grinders were so far decayed as to require extraction; and the parts surrounding these teeth were very much inflamed and swelled.

June 27th, 1821. The above-mentioned four teeth were extracted.

July 10th. The teeth were freed from tartar, and great attention was paid to keep them clean, and the general state of the mouth gradually recovered.

August 21st. The caries was removed with the file from two teeth, and by extirpation from two others, and the cavities were stopped with gold. The lining membrane of one being exposed, was treated agreeably to the principles suggested for such cases in chapter 6, of the second part of this volume.

August 29th. The caries was removed from five places by the file and cutter; in two places it was extirpated, and the cavities plugged with gold. In both these places the nerve was exposed and treated accordingly.

Sept. 7th. The caries was filed away in one place, and cut out in three others; the lining membrane, being laid bare and wounded, was treated accordingly, and the cavities plugged with gold.

Sept. 29th. One tooth was filed; two diseased parts extirpated; in one of which, the nerve being exposed, was properly treated, and the cavities of both were stopped with gold.

Four of the teeth, which had their lining membranes unavoidably laid bare by the last operations, were the very important two upper cuspidati and two incisors of which the disorder had been so greatly aggravated by the previous injudicious treatment, and of which so much of the bony structure had been removed by the previous improper filing, that by the extirpation of the carious parts, not only was the exposure of the lining membranes rendered unavoidable, but, also, scarcely enough of bony substance was left for the reception of the stopping. From similar causes, all the other operations had been rendered exceedingly difficult, and much more uncertain than in cases where the effects of disease only are the subject of dental treatment. Nevertheless the operations were effectual, and I have the pleasure to know that the teeth were preserved by the course of treatment adopted at a time when a little further delay might have caused their inevitable destruction.

CASE VIII.

Of the following I am myself the subject. At the age of eighteen, I considered my teeth (twenty-eight in number, the wisdom teeth not having appeared) to be perfectly sound. I applied to a dentist to have some tartar removed. In performing this operation, a small cavity was discovered in the second large grinder on the right side of the under jaw. The dentist proposed to stop it, and I gladly assented, for my teeth were of inestimable value in my opinion. It was done with tin foil, and the caries had not been perfectly removed: the tooth continued tender, and the stopping soon came out. Inflammation of the lining membrane and a violent tooth-ache succeeded, which obliged me to submit to the extraction of the tooth.

In 1808, about three years subsequent to the stopping, the above tooth was extracted with the common key, that being the only instrument in the possession of the operator. I shall not soon forget the course of proceeding in this case. He first attempted to remove the tooth towards the outside; but, unfortunately, he broke off the crown, and left the root. I insisted on being rid of the latter, as I had a strong abhorrence of dead teeth and roots. He attempted to get them out with the same instrument, by working towards the inside of the mouth, and succeeded, it is true, in carrying away the greatest part of the roots from the socket, but not from the gums, of which a large portion was attached so strongly to the roots, that, notwithstanding every attempt, the operator could not tear them apart. I requested him to use a lancet, or some cutting instrument, but, amongst all his surgical apparatus there was nothing so well suited as a common table knife for the separation of the adhering gums. Being anxious to see the tooth, I took it out of my mouth myself after the gum had been detached; but judge of my sensation when I found attached to it a considerable portion of the alveolar process about an inch and a quarter long, and a third of an inch broad. A great part of this was a portion of the socket of the first molar and extending beyond it, and the remainder was a part of the alveolus, intended for the reception of the third molar, which had not yet appeared. A considerable portion of the gum was also attached to this: one of the roots was broken, and part of it yet remained in the socket. The bleeding was profuse, but was arrested without any dangerous consequences.

The excuse given for this grievous proceeding was the common one: viz. that the union between the tooth and the socket rendered a separation impossible. I affected to believe this account, but kept possession of the parts, and after I left the operator I examined them, and, as I expected, separated them without great difficulty.

I suffered much during the operation, but my sufferings were much greater afterwards. Inflammation followed the laceration and bruises occasioned by the application of the fulcrum of the instrument upon the neighbouring parts. I was confined to my room for some days, and a considerable time elapsed before the parts perfectly healed. This was not all. A great loss of parts was sustained which could not be restored, and from the efforts of nature to rid itself, and in consequence of the absorption of the remaining part of the root, I experienced pain occasionally, and great tenderness in those parts of the mouth for about four years. But the mischief did not stop even here. The wisdom teeth of my under jaw have never made their appearance; their absence being, I presume, to be attributed to the irritation of the parts about the usual period of their formation. The long continuance of more than ordinary exertions of nature on the right side to communicate a healthy action to the parts might very possibly prevent the formation of the tooth on that side; and from the great sympathy existing between the opposite parts of the same maxillary bone and the teeth, I attribute the circumstance of this tooth not being formed on the left side.

In 1810, being desirous of preventing the recurrence of a like misfortune, I consulted another dentist, who proposed stopping the second upper large grinder on the right side, which also was done very carelessly with tin foil (*staniol*) and the stopping came out a few years after the operation.

In 1813, I applied to a dentist in America, who repeated the operation with gold. It was then discovered that the opposite second large grinder in the upper jaw was also carious; and that tooth was stopped in the same manner. But these operations were also improperly performed. The carious parts had not been entirely removed, nor the gold firmly fixed in the cavities. The decay, in consequence, proceeded very rapidly, and at length a severe tooth-ache came on in the left molar tooth. On examination, I discovered that the gold was loose, and mixed with other decayed matter, was only hanging in the cavity. On the insertion of a blunt probe, I experienced considerable pain, and discovered that the caries had penetrated to the lining membrane of the tooth. I determined, therefore, to extract it on the following morning, and to perform the operation with my own hands; being now exceedingly disgusted with the manner in which every operation to which I had submitted had been performed.

On reflecting also on the advantages which I might professionally derive from performing this operation upon myself, I was glad to have the opportunity of being enabled to ascertain the progress, and of minutely recording the successive gradations of the pain which I might have to endure, that I might know how to

proceed hereafter, and to prevent unnecessary pain to others in a similar situation. The following is a faithful and particular account of the proceeding.

1816. Sept. 11th. I extracted the second large grinder on the right side of the upper jaw. The tooth was firmly seated in the socket, and had three roots. The caries having only just reached the nerve, no considerable inflammation or suppuration existed in the lining membrane, or in the surrounding parts. The operation was performed with the forceps, and so slowly as to enable me to feel distinctly the successive gradations of pain. On seizing the tooth with the instrument, I felt no pain whatever. On removing it somewhat to the outer side of the mouth, it seemed that I could distinguish the gradual tearing of the periosteum on the one side, and the crushing of it on the other. The pain of this part of the process was but trifling. When, however, the periosteum was perfectly separated, and the nerve cords torn off by pulling the tooth out of the socket, there was a sharp momentary pain, much like, but not greater than what I had felt the evening before, for about an hour.

1816. Dec. 5th. I felt a like pain in the second large grinder of the upper jaw on the left side. It was diseased precisely like the other, had been equally injudiciously stopped with gold, and was, therefore, in like manner extracted. This tooth was seated in the socket more firmly than the other, from not having lost its antagonist in the under jaw; yet the operation was rather less painful. After having removed this tooth, I discovered that the wisdom tooth next to it was also diseased, and having given up all hope of obtaining any useful aid from the profession, as well as of the formation of its antagonist, I determined on extracting that also. The wisdom tooth in the upper jaw, on the right side, being a little loosened by the loss of its neighbour, and particularly by the want of its antagonist, I likewise removed that at the same time, and in the same manner, without finding any difference in the sensation.

Since that period, in consequence of general ill health, my teeth must have suffered considerably; but from the benefits derived from various operations performed upon them by my friend, Mr. Edward Hudson, a dentist of great respectability of Philadelphia, added to the daily attention, and such treatment as I could bestow upon them myself, they remained for a considerable time in a state of good health and preservation.

1824. July 9th. It will be seen from the foregoing account that I was, after the last operation, in possession of all my teeth, except the four wisdom teeth and the two upper, and the right under second large grinders; the left under second molar tooth being the only one now remaining without its antagonist, and

consequently the only useless part of the masticating apparatus. This inutility would have been a sufficient motive, in my opinion, for extracting the tooth immediately, if I had not been deterred from the operation by other circumstances; namely, 1st, because the tooth, being one of the under jaw, was one of the most difficult to extract by a dentist operating on his own person, although it is one of the easiest to extract from the mouth of another; and 2ndly, I had not yet forgotten the agonizing pain I had experienced in the extraction of the opposite second large grinder, and its unpleasant consequences.

During the last few years, however, the injurious effects of the retention of this tooth became very evident, and its neighbouring teeth were not only the weakest and most tender, but the gums and sockets were much injured by it, and gradually wasted away, whilst the tooth remained perfectly sound, and as firm as ever. I thought it necessary therefore to extract it, notwithstanding the great pain and other inconveniences I apprehended.

The instrument best calculated for the performance of this operation on my own person, was that invented by Dr. Physick, which will be described in Part ii. Chapter iii. On extracting Teeth. By the pressure of the two blades of the instrument, which were placed between the first large grinder and the tooth to be extracted, the latter was slowly pressed towards the posterior part of the mouth, and lifted about one-twelfth of an inch out of the socket, by which the periosteum of the anterior parts of the roots was gradually torn asunder and that of the posterior parts destroyed by pressure; at the same time the nerve cords of the two roots were divided. The tooth after this was only mechanically held in the socket, hence it was extracted by the forceps.

The pain I experienced in the extraction of this tooth was no greater than that in extracting the others, and I candidly assure my readers that I would rather at any time suffer this pain, than be the spectator of the agony of a very timid patient about to become the subject of the same operation.

1825, Jan. 7th. During the last two or three months, I was sometimes annoyed with chronic pain in the first upper large grinder in the right side, which had been stopped with gold. The stopping was at the anterior side, opposite to the second small grinder and near the neck of the tooth. It was situated so closely to the gums as to be invisible to me. From the symptoms, however, I suspected that the stopping had become loose, or had fallen out.

The chronic pain which I had experienced in the tooth extended over the whole of that side of the face, and I also suffered considerably from the rheumatism in the right shoulder and arm, accompanied with soreness of the throat. The latter I attributed in some

measure to the damp state of the atmosphere at the time. During the night of the 6th of January, I had suffered the most excruciating tooth-ache, accompanied by acute pain in all the upper and under teeth of that side, and also in the whole side of the head, together with ear-ache and such extreme pain in the right eye, that the tears flowed copiously down my cheek. The pain in my right shoulder and arm, and the soreness of the throat, were also greatly increased, and attended with much fever. During the night I found some relief by bathing the parts surrounding the tooth with the tincture of opium; and on the following morning I extracted the tooth with the forceps, in the manner I have had occasion to describe already. The relief produced by the operation was truly astonishing: not only all the rheumatic and nervous pains of the other teeth, and of the face and head, as also those in the ear and eye, were instantaneously removed; but even the soreness of the throat, and the rheumatic pain of the shoulder and arm very soon subsided.

By examining the tooth, I found that the stopping had been out for some time, and that the caries had proceeded so far as to irritate and expose the lining membrane of the tooth. No supuration had, however, taken place in that membrane, and I really believe there might have been some chance, even at this time, of preserving the tooth alive for many years to come, had the nerve been treated in the manner to be described in the second part of this essay. But knowing the difficulty of that treatment, and the great judgment and operative skill it requires, I should have been unwilling to submit to its application at so advanced a state of complicated caries, by any operator less familiar with its principles than myself.

1826, April 22nd. The first upper large grinder of the left side, which had been stopped and filed in the same manner as the opposite one, the last extracted, had become tender, and prevented mastication on that side. To avoid in time the annoyance which I expected to sustain from a longer retention of this tooth, I extracted it in the same manner as the last, and with very little pain. I found the gold mixed with some carious matter, and the disease imperfectly cured. By a proper treatment, however, I could have preserved this tooth, in the mouth of any other individual, during life.

It seems, therefore, evident that from the general want of knowledge of the principles in dental surgery, laid down in this essay, I am deprived of ten valuable teeth; viz. the eight which have been extracted, and which might have been preserved alive, and also the two wisdom teeth, the formation of which seems to have been prevented by the unskilful operation related in the former pages.

In conclusion, I sincerely regret the length to which this case has been extended; as well in regard to the readers, as myself; and I hope that my teeth will hereafter remain in such a condition, as neither to furnish any facts to lengthen the case, nor to extend my experience.

CHAPTER VI.

Of the Morbid Effects of the Diseases of the Teeth, and the Parts immediately connected with them, upon the General System.

To be convinced of the great sympathy existing between the teeth and gums and the general system, we have only to look at the many diseases which accompany even their original formation, and the shedding of the first set; maladies so often dangerous and fatal to infants, that it may be safely asserted, that upwards of one-fifth of the children that die under the age of three years, are lost to society through the influence of this cause.

The consideration of this fact alone is sufficient to prove the fallacy of the Hunterian theory, which maintains that the teeth are unorganized structures; but a just and comprehensive view of the diseases of the teeth, and the parts connected with them, and of their morbid effects upon the general system, cannot fail to show the absurdity, and the dangerous and injurious consequences of this theory, if not to effect its total prostration.

If the natural process of the first dentition, when in any way obstructed, is capable of occasioning such dangerous and fatal consequences, it is but reasonable to suppose that the actual maladies of the teeth must indeed produce much greater morbid effects upon the constitution; and, although the obstruction of this healthy process may be the cause of more immediate danger to the delicate and more irritable infantile constitution, than the effects of the actual morbid state of the teeth upon the general health of the adult; the symptoms in the former being generally of an acute, and those in the latter of a chronic nature; it is nevertheless true, that the morbid consequences of the latter, are more extensive, and of much greater duration, and even more certainly destructive in their ultimate effects.

To form a more distinct conception of the very powerful morbid influence which the diseases of the teeth, and their contiguous parts, must unavoidably produce upon the general constitution, it is necessary to consider the peculiarity of the structure and functions of these parts.

The extremely hard and dense structure of the bony parts of the teeth, and the great arterial activity and nervous irritability

of their lining membranes, which can so powerfully, and for so long a time defend the teeth against general and local morbid influences, are also causes of their producing very extensive morbid effects upon the whole system. The functions of the teeth as well as of the gums, when in a healthy state, which acts as powerful stimuli towards their preservation, are, when these parts are diseased, or affected with disorder of any kind, constant causes of irritation upon them, as well as upon the general health.

If we acknowledge the morbid influence of general disorders upon the teeth and gums, which I believe cannot be denied, it naturally follows that they must also partake of the healthy actions of the system, and that they must be benefitted by the influence of its curative efforts; at least in the same proportion as other parts, when affected by specific diseases.

The bony structure of the teeth, however, having in itself but very little self-restoring power, and their peculiar functions being much less favourable to this natural process, than those of any other part of the body, and the teeth and their gums, periosteum, and sockets being altogether dependent on each other, this power is much more constantly, and in a much higher degree required, and seems to be much more exerted by these, than by any other structures; and the more these powerful efforts are incapable of curing the dental diseases, and resisted in their efforts to remove their causes, the more active is the constitution in its attempts to resist the progress of such diseases; whilst, at the same time, a considerable portion of general health and strength is consumed in the struggle.

Diseases of the bony structure, and, indeed, of the teeth and gums generally, when yet in their incipient stage, and without being influenced by any other causes than the local disorder itself, produce no greater constitutional effects than other local maladies; but with this difference, that their self-curative action is exerted in a proportion, corresponding to the peculiar structure, functions, and relations of these parts, and, therefore, comparatively much greater, and longer continued than that produced by diseases of other parts or bones. In this state they proceed very slowly, and their morbid effects can only be detected by the most minute attention.

The general system, however, in the meantime being often disturbed, the caries will be found to proceed much faster towards the cavity of the teeth, and the inflammation of the gums to increase. In that event, any constitutional disorder is competent to aggravate the local one, whilst the latter, also, in its turn, greatly excites and augments the former. At this period it may be still taken as a general rule, that the morbid influences of general disease upon the dental maladies are more powerful than those of the teeth upon the general system.

When the lining membranes of several teeth are irritated by caries, or other diseases of the mouth have become extensive, the whole constitution will be symptomatically affected, and the restorative process of nature will be roused in a very remarkable manner: and, while the whole arterial system and the absorbents seem to be most active in the attempt at restoring the affected parts, an increase of inflammation and idiopathic diseases of the lining membranes and gums, are the invariable effects of this action.

During an acute paroxysm of tooth-ache, this peculiar sensibility of the lining membranes of the teeth, as well as in those parts immediately connected with them, is in fact not to be doubted, and is unquestionably the principal cause of distress to the patient; and a proof of this sensibility, and of its remarkable influence upon the general system, are the violent symptoms occasionally produced by an acute affection of even one tooth: such as excruciating pain in the tooth primarily affected, as well as in contiguous or more distant parts consenting with it. Should, however, the maladies of the teeth especially those of the gums, be in a more chronic state, the violent pains in the parts first affected may frequently be altogether absent; and, while the idiopathic dental diseases are sometimes disregarded or overlooked for a considerable time, many of those symptomatic affections may be produced, and proceed to their utmost extent without their original causes having been detected, *e. g.* ear-ache, inflammation of the eyes, sore throat, convulsions, epilepsy, &c. See Cases, 8, 16, 28, 29, 30, and 40.

During the gradual destruction of the lining membrane of one or more teeth, either by an acute or chronic process, all the maladies of the other teeth and the parts connected with them, generally assume a more serious character. The slightest irritation or pressure will produce more or less pain in the teeth most affected, while the others become also more tender; the tartar will in general accumulate very rapidly, and the gums and periosteum become also more and more diseased. Caries and all other diseases, in the teeth and gums so affected, advance very quickly, and, while the system is constantly exerting itself to effect a cure of these diseases, the lining membranes at last, after a long struggle with the inflammation in them, are totally destroyed by suppuration.

Such teeth, after the loss of their vital principle, become not only a direct cause of irritation to the nervous system, by acting morbidly upon its dental branches; but also a most powerful indirect cause of idiopathic diseases of more or less importance in all the parts connected with the teeth.

At this period the dental maladies, and the symptomatic inflam-

mation in the living teeth, change in general from the acute into the chronic state, and the patient, no longer the subject of tooth-ache, flatters himself that he is substantially, or perhaps entirely relieved. But he is deceived; for the interval, or remission of the pain, will prove of but short duration. The diseases are in fact, rapidly advancing from an acute, into a chronic form, under the circumstances of which their ravages become more certainly and extensively destructive to the structure of the parts more immediately affected, and the cause of increased disturbance and derangement in the functions of parts consenting with them.

The teeth having been deprived of their vitality by the destruction of their lining membranes, are not only rendered useless, but are converted into lifeless incumbrances upon the system, which produce, by their mechanical and chemical irritation, an action similar to that effected by gangrene or mortification in other bones, by means of which, nature attempts to throw off the dead part.

The parts surrounding such dead teeth: viz. gums, periosteum, sockets, and maxillary bones, are thus involved in serious disease; inflammation gradually extends over the whole of these parts; and a strong effort appears to be made to effect the expulsion of the decayed teeth, now become dead, and offending bodies. But, although nature might succeed in thus removing almost any other soft or hard part of the body, of equal dimensions, in a few weeks or months, a space of from five to ten years, and sometimes a much longer period is requisite for the removal, by the same natural power, of a dead tooth.

As long as the primary diseases are principally confined to the teeth themselves, and in those instances where they are the proximate local causes of diseases of the mouth, without supposing the existence of many dead stumps of teeth, so long may we look for those acute symptoms and effects which have been stated, and see them change alternately from one form of disease into another; but after that period, or, when the local maladies having originally commenced in the gums, periosteum, alveoli, and maxillary bones, shall have extended to a certain degree, that total transition into a permanent chronic state of the disease takes place, to which I have above alluded.

In such a state of the disease, nature seems exclusively and actively engaged, by producing inflammation and suppuration in extricating the mouth from all the morbid causes affecting the diseased parts, such as, dead roots and stumps, tartar, and teeth which are loose, or irregularly situated. The sanative power of nature being, however, very rarely competent to effect such a cure, the various diseases of the gums, periosteum, alveoli, and maxillary bones are exasperated, and for the most part terminate in a state of suppuration and mortification.

At this period the malady has arrived at a point where it would seem to be altogether disregarded by nature, when the morbid parts are left in an inactive or exhausted state, without any protection against the numerous causes of destruction to which they are thus exposed.

Hence the frequent chronic state of all the diseases of the teeth and the gums; hence also, at this time, the absence of great pain and acute sensibility in the parts affected; whilst various symptomatic, chronic, and nervous pains may be observed in the most distant parts of the system, as in case 30, and hence, likewise, the more speedy progress of all diseases of the mouth at this period than at their commencement, and our frequent observation of several teeth being transformed into so many rotten stumps and fragments, in a very short period.

The constant discharge of acrid matter accompanying the advanced stage of these diseases, becomes an aggravating cause of morbid affections of the mouth, at the same time that excitement of the dead and decayed parts must also naturally produce considerable symptomatic affections of the whole system; and, whilst nature succeeds by the process of absorption in gradually removing a small portion of the offending bodies, the morbid actions, by which this removal is effected, are becoming more and more operative in the production of new causes, and in the extension of disease.

Thus, for instance, while nature is active in throwing the dead roots and teeth out of their sockets, the same action is also extended to the sockets of the other living teeth, by which the former are rendered diseased, and the latter are affected with caries, or made more or less loose, even so much as, ultimately, to drop out altogether.

The chemical and mechanical irritations, chiefly produced by these dead teeth and roots in a putrid state, aggravate, at this particular time, not only all the local diseases of the teeth, but also the inflammations and suppurations in the gums, periosteum, alveoli, and maxillary bones; in consequence of which, new idiopathic inflammations, suppurations, and mortifications are caused, which sometimes determine to one or the other of these parts, and produce maladies of a most dangerous and painful kind. See Cases 24, 25, 26, and 27.

The parts surrounding dead teeth or roots are never in a sound state, as is frequently very erroneously believed; the bones are rendered spongy, or sometimes callous and thickened; but generally perforated in various directions and parts, and not unfrequently in a state of mortification. This will be proved by pathological preparations, or careful examination after death. In one instance I have seen mortification extend along the upper

jaw, more than one inch from the extremity of a dead root of the tooth.

By the combined morbid actions of all the above causes, the teeth are more and more rapidly destroyed, and go through the same destructive process, losing their vitality like those already dead; while the latter waste away by gradual, constant putrefaction or decomposition.

Purulent and other morbid fluids, secreted by diseased affections of the teeth and gums, may well be presumed to find their way, in no trifling quantity, into the stomach, by which the digestion must be much impaired, and various symptomatic and idiopathic maladies of the different digestive organs produced: such as, for instance, dyspepsia, hysteria, hypochondriasis, &c.

A considerable portion of this very obnoxious matter is dispersed in the system by the absorbents; and, when suppuration and putrefaction become general in the teeth, and all the other parts more or less connected with them, the breath is rendered so excessively offensive as to poison the air as it passes to the lungs, which cannot fail materially to affect the blood, as well as those precious and delicate organs.

Moreover, during all this time, the numerous primary diseases of the mouth and their irritating causes constantly attack the general health in a violent manner, not only by the several channels above-mentioned, but more directly by the nervous system, sympathizing with the dental nerves, and the many fibres of the gums, &c.

These nervous irritations are rendered the more dangerous by their sensible effects, because the dead roots and teeth irritate constantly the most irritable parts of the affected nerves, such as the ends or processes of the fifth pair of nerves, and those nervous fibres particularly related by contact to the great sympathetic nerve. From the supposed morbid state of the parts, these nervous processes are also in an actually diseased state, whilst likewise the whole system labours under the consequent symptomatic affections.

Sometimes, either from a high state of general debility, or from considerable local relaxation, or from the morbid influence of both, so great a torpor may be produced in these parts, that the maladies of the teeth and gums may retain a chronic state for a very considerable time, and almost without interruption, and the parts may be so devoid of sensibility as to experience neither pain nor, comparatively, any other inconvenience.

Should such a state be the effect of local debility, the parts are in great danger, and their morbid effects upon the system may be presumed to be much more considerable than under ordinary circumstances. Should, however, the local debility or torpid

state be induced both by constitutional and local causes, the morbid influence upon the health would be most considerable; and no durable health could be restored without equal attention to the removal both of the general and local causes.

Delicate constitutions not possessing sufficient general health and strength either to subdue the local diseases, or to support the constant changes, from a lingering or delicate state of health to that of an acute malady, from that again back to chronic disease, from general to local, and from local to general affections, such as are called nervous and rheumatic diseases of every description, are thus gradually worn out. This event may take place sooner or later, according to circumstances, by which certain occasional causes of diseases are brought into contact with the permanent or constantly acting causes, so as to act simultaneously towards the destruction of health and life.

Such is often the progress of these local diseases of the mouth, when produced by general and local natural influences only. Should, however, at any time, an injudicious dental treatment be added, such maladies will be much aggravated, and made more rapid and destructive, as well as very probably, more prematurely fatal in their termination.

In such instances, some of the local diseases of the different parts of the mouth may assume a character of the most distressing kind, sometimes even of a malignant or cancerous nature, in consequence of which life is rendered a heavy burden, till a most painful and horrible death releases the poor patient from his sufferings. See Cases 4, and 27.

Still at any period of the diseases, so long as the general constitution is not quite worn out, and the local maladies are not in their own nature fatal, a perfect restoration to health may be obtained by judicious treatment. See Cases 5, 24, 25, and 26.

I do not mean to assert that the diseases of the teeth do most frequently proceed in such a fatal manner, but I am perfectly convinced that that they do so much more frequently than is generally supposed, and too often without being detected. They act like slow poisons, slow but sure: they will destroy either in a direct or indirect way; but towards destruction they certainly tend.

In strong constitutions which are little influenced by local diseases of the mouth, and in which the affected parts are not excited by general causes or irritated by previous mal-treatment, the maladies of the teeth, and still more those of the neighbouring parts, may proceed to a considerable extent without being accompanied by very painful symptoms, either local or general, and even without much apparent inconvenience.

In such instances the diseases of the mouth are so slow and

gradual, yet so certainly progressive in their chronic state, that sometimes not one part connected with the teeth is left in a perfectly sound state; until at length the whole catalogue of the diseases of those parts may be seen to meet in one and the same case; and in the same regularly slow and progressive manner in which these maladies have proceeded, they will also sometimes again decrease, and nature alone will effect a perfect cure by the removal of every tooth, and by the consequent annihilation and total absorption of the alveolar processes.

In cases of this kind, the general health always maintains its predominance over local disease, and one diseased part becomes the means of effecting the destruction of another. The principal local causes of the diseases of the gums, periosteum, and alveoli, being decayed or dead teeth and tartar, and the principal causes of the maladies of the teeth themselves being the diseases of the gums and sockets, the diseases of the gums are cured by nature only, by the removal of all the teeth and tartar, and by the absorption of the gums and alveoli.

I have seen many individuals in the United States of America, and some in my native country, as well as in England, who had lost or were losing their teeth in this manner.

This progress of the diseases of the teeth and gums will be most frequently observed in the more healthy of the lower and ignorant classes of society whose teeth are generally left to nature, in consequence of which they are frequently suffering from neglect, but very seldom from artificial causes; for the nervous sensibility is, generally, much less in uneducated people, and the constitution less irritable than in the enlightened and polite classes of society.

In the male subject, diseased affections of the teeth proceed more frequently in this manner than in the more delicate female constitution. This progress is observed also more at a later period of life than at an early age, for the density of the dental bones at a more advanced age being more and more on the increase, and the sensibility of the solid parts of the mouth being proportionally on the decrease, it very naturally follows, that the progress of these diseases generally must be slower and more regular, and the symptoms much milder in old than in young persons.

Hence, in tolerably good constitutions, and at advanced periods of life, cures are sometimes effected by nature alone in the manner here alluded to. In these instances the symptoms and inconveniences accompanying the diseases are frequently so mild as not to be observed, and thus the individual loses all his teeth, and not unfrequently considers their total loss as the unavoidable effect of old age; an opinion however, equally as improbable and erroneous as would be the belief that we were destined to lose our tongues, or any other essential part of our body from old age.

It would, however, be very erroneous to infer from the great varieties and degrees of the morbid influences and symptoms incident to diseases of the teeth, and from the occasional opportunities which we have of seeing that nature now and then effects a cure of them after a long struggle, that such examples of natural cures should often present themselves. Like all other local affections, these diseases only differ in their greater or less severity, according to the more or less predominance which they are able to obtain over the whole constitution: and whilst they occasion rapid destruction of health and immediate death in some rare instances, they never fail to waste a greater or less portion of human health, of which, indeed, the least loss may be a sufficient cause, in combination with others, to shorten the period of human life.

At the same time, it must not be forgotten that such a cure can never be accomplished by nature, until all the teeth are lost one after another from being destroyed, either by disease or putrefaction, or by a total absorption of their gums, periosteum, and sockets. This cure is, indeed, never effected without more or less pain and inconvenience during a period of from fifteen to twenty-five years; although the symptoms and inconveniences during much of that time may, from many circumstances, be rendered very supportable: whereas, by the judicious interposition of art, perfect cure might be effected, in every case of this kind, in a space of time never exceeding five or six, and frequently even in less than two months.

After the loss of all his teeth by the process here described, the patient feels emancipated from his afflictions, and enjoys much better health than for many years previously, and frequently he recognizes the real causes of the protracted disturbance of his health only after his actual recovery; whilst it is also not uncommon for persons in the course of years to lose, in the manner above described, every tooth in their mouth, without ever suspecting the real cause of their disorder.

In fact, the influences of decayed and dead teeth, and of the diseases of the gums and sockets upon the general animal economy, are ordinarily so little understood, and regarded so erroneously, and with so much prejudice, that such a transition from protracted disease to general health not only surprises the happy individual himself, but also not unfrequently baffles the sagacity of his better informed medical attendant. See Cases 16, 28, 29, and 30.

This, however, will not be deemed surprising if the difficulties of discovering these causes are duly considered. Idiopathic diseases, while they only affect parts of so limited a nature as the lining membrane of a tooth, are capable of almost overwhelming

the entire system by nervous irritation, so as even to produce actual madness, but are, nevertheless, for the most part to be detected only by dint of a most minute acquaintance with the pathology of the parts immediately concerned. See Dr. Rush's Medical Enquiries and Observations upon the Diseases of the Mind, p. 35.

The difficulties here supposed are owing to the great variety of circumstances accompanying the diseases of the teeth: viz. the different aspects which they assume; the manifold effects and symptoms produced by them; the comparatively small and hidden parts and surfaces which the idiopathic maladies occupy on one hand, and the greater or smaller distance, and the greater extent of the parts and their surfaces, which are symptomatically affected on the other; the sudden changes of the symptomatic affections from one place to another, the frequent absence of pain, or the comparatively slight pain accompanying the idiopathic local malady, and the consequently greater pain accompanying the symptomatic affection, together with the frequent translations of the nervous and rheumatic pains from the parts primarily diseased to those which are secondarily affected, and *vice versa*: all are of such a deceptive nature as to be not a little calculated to mislead any medical practitioner, who has not very just notions on this subject.

To these deceptions, moreover, may justly be added the many erroneous prejudices, false theories, and malpractices existing on this subject, and which are generally adopted and resorted to by dentists when consulted; as also the great difficulty of properly removing the idiopathic diseases and their causes in the present imperfect state of dental surgery; the misconceptions derived from unsuccessful treatment, and from the injurious effects so frequently produced upon the teeth by an injudicious application of the resources of the art. See Cases 9, and 11.

Nevertheless, I cannot refrain from expressing my firm conviction that the important connexion subsisting between the teeth and their relative parts on the one hand, the general system on the other, and the exceedingly great influence, whether favourable or otherwise, of the former upon the latter, have not hitherto received so much attention on the part of physicians and surgeons as they really deserve and justly claim.

Would the more liberal members of the healing art determine their earnest attention to the diseases of the teeth as causes of diseases of the general system, I feel confident that it would contribute in no small degree to the extension of their professional powers.

In those affections, which are generally classed under the list of nervous and rheumatic diseases, whether chronic or acute, the teeth, if in any way disordered, may always be suspected to be the principal causes.

The immediate connection of the teeth and the other parts of the mouth with the digestive organs and the lungs renders it still more probable that the maladies of the teeth may very frequently constitute a considerable part of the exciting causes of primary and secondary derangements of these important parts; while it is also very evident that, in consequence of their close relationship with the brain, the delicate organs of the senses of hearing and of sight must very often be much impaired, and painfully affected during diseased states of the teeth, gums, alveoli, maxillary bones, and their investing membrane, the periosteum.

I beg to observe, in conclusion, that the maladies of the teeth are much more common in America than in any other country that I am acquainted with. They are also much more acute and violent in their symptoms, and by far more rapid in their progress, than perhaps in any other climate.

They are, however, unhappily, too frequently to be met with on the continent of Europe, and much more so in England than is generally supposed; and although slower in their progress, they are not less certainly destructive in their ultimate results than in America.

In my practice in different parts of the world I have had sufficient opportunities of observing the various states, character, and progress of the diseases of the teeth to enable me to form an almost just estimate of the differences of these diseases in different countries, and especially in England and America; and although the above statements are principally founded on observation and facts collected during a long and extensive practice in the United States of America, my experience in England has, however, been sufficient to confirm my previous views.

In illustration of the facts stated in this chapter, I beg to refer the reader to a few cases here annexed, which have come under my observation in England, and also to some of those related in other parts of this volume: viz. Cases 2, 3, 8, 13, 14, 16, 24, 28, 29, and 30.

CASE IX.

Mrs. P—— a lady of great respectability, under the medical care of Dr. Jule Rucco, of Leicester Square, had, some years since, continually suffered from dyspepsia, as well as from various kinds of nervous attacks of a very annoying and alarming nature. This judicious physician had for a long time suspected the cause, and frequently proposed to consult me. By the wish of the lady, however, the dentist of the family was at last sent for, and three or four teeth and roots were removed, which, according to the assertion of the dental attendant, were all that could be extracted. The disease, however, was only aggravated by this interference, and the sufferings of the patient increased more and more.

About six months after, the Doctor again urged a meeting

with me on the subject, and at last I was sent for. I found the lady labouring under a complete salivation, from an extraordinary sympathy of all the glands, in any way connected with the teeth. On the previous night, and indeed for many nights preceding, she had been suffering such violent fits of convulsion, as to alarm the whole family. The face was affected with an acute erysipelatous inflammation, accompanied with head-ache, as also with considerable derangement of the digestive functions, such as sickness, vomiting, loss of appetite, &c. By examining the mouth, I found that the previous dental treatment had been but very partial, and I proposed the removal of every tooth and root which produced irritation.

The lady consented immediately to my proposal, and the necessary operations were performed on the 8th of October, 1824, when nine decayed teeth, some of them mere roots, were extracted. The patient was requested to rinse her mouth frequently with a diluted astringent lotion. By this simple local treatment, and by the further medical care of Dr. Rucco, she was perfectly cured in about a week after the operation.

Very soon after her recovery, the lady was enabled to fulfil a promise of marriage, which for some time had been prevented by her protracted and distressing disease. Since that period she has enjoyed perfectly good health.

The further treatment of the case has however been delayed, on the accomplishment of which, of course, the permanency of the cure will depend.

CASE X.

Mr. F—, a literary gentleman in the neighbourhood of London, had been for some years under the medical care of Mr. J. Derbyshire, of Greek Street, Soho, on account of a constant state of derangement of his digestion.

Much sedentary occupation and some excessive grief had of late greatly augmented the distressing symptoms, generally accompanying this cruel disorder. His disease had assumed the character of hypochondriasis. His spirits were so dejected, and the state of his bodily health was so low, that he was no longer capable of attending to his ordinary business.

Having had some conversations with Mr. Derbyshire on the influence of disease of the teeth upon the general health, that gentleman was induced, at his next visit, to inquire into the state of his patient's teeth, and learning that they were in a very deplorable condition, he proposed a consultation with me on the subject.

After a particular examination, I found every tooth in the patient's mouth more or less carious or dead, and all the gums and sockets in a very diseased state.

On the 27th of May 1824, twenty-one teeth and roots were extracted, all of which were more or less in a state of putrefaction; three large grinders only excepted, which were either suffering from complicated caries, or producing morbid irritation upon the other parts from some other causes.

Four upper and four under incisors, two upper and two under cuspidati, and two under bicuspidates; fourteen front teeth in all, were left remaining. These and all the other parts of the mouth were restored to perfect health in the course of about six weeks.

During the progress of this treatment of the diseases of the mouth, the general health improved very surprisingly; and after the restoration of perfect health to all the remaining teeth and their relative parts, the patient enjoyed uninterruptedly good health, and returned to his ordinary professional avocations.

CASE XI.

The following is a letter which was handed to me by Miss B —, Manchester Street, London, in the beginning of the month of May 1825. The history it gives, is perhaps one of the most distressing cases of its kind, concerning a lady of great respectability and rank in Scotland, of about thirty-eight years of age. Its contents indeed are not less remarkable for the manner in which they display the uncommon fortitude of the unhappy sufferer, than for the striking confirmation which they give of the facts which I have detailed in the foregoing chapter, as well as of the description I have given respecting the present state of dental surgery.

Considering this evidence as most useful and important, I beg to submit to the reader the whole of the fair sufferer's most interesting and affecting communication.

"My DEAR——. I have been so ill since I wrote you last, that I have not been able to answer your kind letter. As I can express myself easier to you than to a stranger, I shall endeavour to give you some idea of my present state, and you can give my letter to Mr. Koecker. Constant faint gnawing pains in my gums, membrane of the mouth, and cheeks, accompanied with considerable swelling of the latter, which are always blotched, inflamed and irritated, just in the way some people's faces are affected when suffering tooth-ache: my very nose is swelled and inflamed, and the muscles of the under part of my face so contracted and drawn upwards, that I cannot swallow any thing but liquids. My mouth is contracted and full of slimy saliva. In bed I have constant twitches in my gums, like what I could figure electricity: sometimes my gums and face burn like fire, and sometimes feel as if every nerve and blood-vessel were filled with ice, and the sheets near my mouth are wet with saliva; all these

sensations often run down behind my ears, to my neck and arms, and at these times I have a great hurry and agitation of spirits, and aching across the breast and heart. To me, one of my greatest tortures is the extraordinary inflation of gums, particularly towards the roof of my mouth, they feel as if they absolutely tore from the bone, hove up as it were with wind, and my jaws feel twice too large for my mouth, the pressure against my face is such. The same sensation often proceeds to my cheek bones, which increases the swelling of the muscles, and the dragging up of the under jaw. I must now go back in my history, that Mr. Koecker may know the progress of the last *five years* of my continual misery ; but, unluckily, I fear it is impossible to make any one understand my sufferings, they are too various and complicated. You know I always blamed my teeth as the cause of all my sufferings; but I am now convinced that the disease is in my gums, and remains of the alveolar processes; and, as I was told that was a part of his profession Mr. Koecker was supposed to be very skilful in, it makes me very anxious to have his opinion. You will remember how long (many months) the sockets of my large molar teeth stood open, and even when they did heal up, the gums were full of morbid sensibility. When I last saw you, I had only about five front teeth remaining, and eight below ; about 1818 they began to ache a little, and as usual to irritate and inflame my cheeks; the five upper ones began to spoil, but I fought on with them till the winter 1819, when the inflammation and the various sensations I have mentioned before as now suffering, increasing, and the teeth themselves aching, I had them pulled; the gums swelled and inflamed most dreadfully, the horrid sensations in the roof of my mouth increased, and my face was as bad as ever. In about a month the wounds healed, but the gums remained swelled and became a hard white gristle. After suffering for many months I had the gums opened, they were so hard and thick the dentist said they were like bone, the sockets were not the least absorbed, of course rough (and in some parts exfoliation.) The gums were kept open near a month, and caustic applied to excite absorption. In the course of this process the point of a tooth was discovered in one of the sockets and extracted; it was a full-grown eye-tooth, which for want of room had never made its way down; I was easier as long as the gums were open; but just where I was when they healed up and resumed their state. Some months after, my under jaw became affected, the teeth there were not spoiled, but became so painful to the touch that I could bear nothing in my mouth to touch them. My lips became very tremulous, and my hands trembled so that I could neither feed nor dress myself; when warm in bed they ceased, but from the moment I rose and began to speak, or let the air into my

mouth I never ceased trembling, and the dry retchings (which you remember how tortured I used to be with) increased so as to bring on vomiting. I suffered in this way for eleven weeks; when, in despair, I had all my remaining teeth pulled; the tremblings and retchings quickly abated, and in a few weeks completely left me, and I have never had them since: my under gums, even before the teeth were pulled, were a hard gristle, and almost as white as the teeth. My gums have been often opened to give me relief, but as nothing will induce them to suppurate I get no advantage, the wounding only increasing the hardness; these gums seem to me to act as levers pressing on the nerves and blood-vessels, and keeping up a constant irritation and inflammation in my mouth and face. Under an idea that my complaint proceeded from neuralgia, I was advised to have the mental nerves divided at the chin, which did no good, and has created such hard tumours on these places that I think their pressure on the side of the jaw is the cause of the twitching pain of my under lip, and the contraction of the muscles. I would take it as a great favour if Mr. Koecker would say whether he thinks he could be of any use to me here, until I am able (which, alas! I fear I am not) to come to London, or if he could give me any advice which I might desire to be done here, and if he will be so very good as to mention what are the different kinds of diseases he has ever met with in the gums or alveolar process, and his mode of treatment. There seems to be an idea here, that if the-sockets are not carious there can be no disease there, but I think Fox mentions otherwise. My upper gums had not been touched for four years till a week ago, when a part was opened that was very troublesome and much swelled: the bone was full of points and inequalities, and rough, sounding gritty like sand; there was a great deal of thick slime like the white of an egg, mixed with blood: some nitrous acid was put upon the wound to try to keep it open a little, but in vain; it is covered already with a new gum, and the old thick parts gaping open; I am sure if these old swelled gums could be got away I should suffer less. I should think there is about the eighth of an inch of the socket remaining, the ridge of the under jaw is as sharp as a knife, and so painful to the touch when I press it, that it makes my face, ears, and neck burn; my lips are painful and are drawn in, I was advised to try false teeth, but they increased my sufferings ten-fold, which is very hard, as the clinching of my jaws adds much to my suffering; my eyes are beginning to be much affected, which must plead an apology to Mr. Koecker for this sad scrawl, which I think you will need to help him to decipher. There are various opinions respecting my complaint; one says it is a nervous complaint at the origin of the nerves, affecting the extremities of these nerves; others say it is

a nervous affection of the dental nerves and their ramifications on the face; and others are of opinion it is an affection of the covering of the bone. I am satisfied it is some disease of the antrum. Could it injure me to have the antrum opened to ease my mind? There is one place where I think there is part of a fang of a tooth, which I am certain was broken, as the dentist burnt the tooth without letting me see it; perhaps that may torment me."

Perusing some of the late Dr. Rush's works, I found that this eminent medical philosopher agrees entirely with my own views on the subject.

The testimonies he alleges are so very strong, that I hope I may be allowed to add them here for the special instruction of the non-professional reader, in full length and in his own words.

In his *Medical Enquiries*, vol. 1, page 199, that celebrated physician says, "Some time in the month of October, 1801, I attended Miss O. C. with a rheumatism in her hip joint, which yielded for a while to the several remedies for that disease. In the month of November, it returned with great violence, accompanied with a severe tooth-ache. Suspecting the rheumatic affection which was excited by the pain in her tooth, I directed it to be extracted. The rheumatism immediately left her hip, and she recovered in a few days. She has continued ever since to be free from it.

"Soon after this I was consulted by Mrs. T. R. who had been affected for several weeks with dyspepsia and tooth-ache. Her tooth, though no mark of decay appeared in it, was drawn by my advice. The next day she was relieved from her distressing stomach complaints, and has continued ever since to enjoy good health: from the soundness of the external part of the tooth, and the adjoining gums there was no reason to suspect a discharge of matter from it had produced the disease in her stomach.

"Sometime in the year 1801, I was consulted by the father of a young gentleman in Baltimore, who had been affected with epilepsy. I inquired into the state of his teeth, and was informed that several of them in his upper jaw were much decayed. I directed them to be extracted, and advised him afterwards to lose a few ounces of blood any time when he felt the premonitory symptoms of a recurrence of his fits. He followed my advice, in consequence of which I had lately the pleasure of hearing from his brother that he was perfectly cured.

"I have been made happy by discovering that I have only added to the observations of other physicians in pointing out a connexion between the extraction of decayed and diseased teeth and the cure of general diseases. Several cases of the efficacy of that remedy in relieving head-ache and vertigo are mentioned by

Dr. Darwin. Dr. Gater relates that M. Petit, a celebrated French surgeon, had often cured intermittent fevers, which had resisted the bark for months, and even years, by this prescription; and he quotes from his work two cases, the one of consumption, the other of vertigo, both of long continuance, which were suddenly cured by the extraction of two decayed teeth in the former, and of two supernumerary teeth in the latter case.*

"In the second number of a late work entitled *Bibliothèque Germanique Medico-Chirurgicale*, published in Paris by Dr. Bluver and Dr. Delaroche, there is an account by Dr. Siebold, of a young woman who had been affected for several months with great inflammation, pain, and ulcers in her right upper and lower jaws at the usual time of the appearance of the catamenia, which, at that period, were always deficient in quantity. Upon inspecting the seats of those morbid affections, the Doctor discovered several of the molares in both jaws to be decayed. He directed them to be drawn, in consequence of which the woman was relieved of the monthly disease in her mouth, and afterwards had a regular discharge of her catamenia.

"These facts, though but little attended to, should not surprise us, when we recollect how often the most distressing general diseases are brought on by very inconsiderable inlets of morbid excitement into the system. A small tumour concealed in a fleshy part of the leg has been known to bring on epilepsy. A trifling wound with a splinter or a nail, even after it has healed, has often induced a fatal tetanus. Worms in the bowels have produced internal dropsy of the brain, and a stone in the kidney has excited the most violent commotions in every part of the system. Many hundred facts of a similar nature are to be met with in the records of medicine.

"When we consider how often the teeth, when decayed, are exposed to irritation from hot and cold drinks and aliments, from pressure by mortification, and from the cold air, and how intimate the connexion of the mouth is with the whole system, I am disposed to believe they are often unsuspected causes of general and particularly of nervous diseases. When we add to the list of those diseases the morbid effects of the acrid and putrid matters which are sometimes discharged from carious teeth, or from ulcers in the gums created by them, also the influence which both have in preventing perfect mastication, and the connexion of that animal function with good health, I cannot help thinking that our success in the treatment of all chronic diseases would be very much promoted by directing our inquiries into the state of the teeth in sick people, and by advising their extraction in every

* *Recherches sur differens points de Physiologie, de Pathologie et de Therapeutique*, pp. 353, 354.

case in which they are decayed. It is not necessary that they should be attended with pain in order to produce diseases, for splinters, tumours, and other irritants before mentioned, often bring on diseases and death when they give no pain, and are unsuspected as causes of them. This translation of sensation and motion to parts remote from the place where impressions are made, appears in many instances, and seems to depend upon an original law of the animal economy."

CHAPTER VII.

Of the Treatment of the Diseases of the Teeth and their Relative Parts.

Introductory Observations.—If the fact is acknowledged, which I believe cannot be denied, that the teeth, by reason of their dense and compact structure and peculiar functions, are almost entirely incapable of recovering from any primary disease by their own natural curative power; and that the least original disorder in them must sooner or later become a cause of total destruction of the teeth affected, and also become a cause of other symptomatic and idiopathic maladies of the other teeth, and parts nearly connected with them, in the absence of proper treatment; it is also a fact, not less supported by experience, that, on account of their peculiar structure, they are admirably calculated to receive the most permanent benefit from a just and skilful application of the resources of art; and that, in almost every case, perfect health can be restored, even in the most advanced or desperate state of disease.

It is, however, particularly worthy of notice, that, although nature has originally supplied the teeth with that peculiar structure, which so well enables them to undergo a successful surgical treatment when in a diseased state, it has done but little to favour the success of such a treatment in affording any active curative power in their bony structure, equally possessed by every other part of the living body.

It is, therefore, evident, that of all surgical operations, those affecting the teeth are least assisted by the sanative power of nature, and hence are most dependent for their success on the judgment and skill of the surgeon; and, though they are the more certain of complete and durable success when properly executed, they are at the same time and for the same reason more difficult to perform, and, what is not less worthy of notice, they are much more injurious and destructive in their effects when unskilfully managed, not only to the teeth themselves, but also to those parts immediately related, and sympathizing with them.

If it is true that the teeth, when completed as to their formation and in sound health, are the hardest and most durable parts of the whole human system, and more admirably calculated to resist the numerous morbid influences to which they are subjected than any other bone of the entire frame; it is also a truth, proved to me by my own observation and long experience, that the same qualification, which is possessed by naturally sound teeth, will be possessed, almost to the same extent, by such teeth as have been restored to perfect health by a judicious and complete surgical treatment; and it is not less true that, in most instances, these restored teeth may be preserved almost as well and as permanently as those naturally sound.

Such cases, however, as shall be considered to have received this perfect restorative and preventive treatment, must have been treated in the following manner, and the following object must have been accomplished.

All the teeth and gums must have been restored to perfect health by being relieved, first, from all symptomatic inflammation or affection in their lining membrane and bony structure; and secondly, from all the idiopathic diseases affecting them. These are objects which can only be obtained by a due consideration of the state of the general system, and a proper cure of all the diseases and irregularities of the gums, periosteum, sockets and maxillary bones, and by such treatment and operations as shall completely eradicate the most immediately exciting causes of these diseases, the caries, or other maladies of the bony structure of the teeth, &c. These parts must also have been rendered permanently sound and a relapse of the disease prevented, as well by remedying the defects, by filling with gold the cavities produced in the bony structure of the teeth, by caries or operations, so as to restore them as near as possible to their natural strength or firmness, as by securing the parts through these means, and their restoration to their natural and regular form, from the influence of all morbid causes, and by having produced every possible facility for applying the necessary preventive means against all future external morbid, chemical, or mechanical influences.

To accomplish all these indications the dentist has many very considerable difficulties to overcome.

The difficulties almost invariably accompanying a perfect cure of the diseases of the teeth and their relative parts, arise from their being generally so complicated as to render their detection exceedingly difficult; in consequence of which they are frequently disregarded by the patient until they have arrived at some of their latest and most untoward stages.

It is indeed very unusual to meet with only one disease at a time affecting the teeth of one individual; whereas a combination of

many diseases acting simultaneously upon the teeth, in such a variety of ways as to require the most opposite surgical treatment, is what we generally meet with. I have not unfrequently found a considerable number of diseases in the mouths of persons, who were so much deceived as to believe that their teeth were perfectly sound, and had been declared so to be not long before, even by their dentists.

The constant changes to which the formation and structure of the teeth, alveoli, and maxillary bones are subjected during the period of the first and second dentitions, are also important causes of difficulty in dental surgery. These changes are very considerable during the first five and twenty years, and a careful consideration of them becomes an object as important to a judicious treatment of these parts, as it is difficult and intricate.

Mr. Hunter, as his introduction to the first part of his *Natural History of the Human Teeth* proves, was not uninformed of these difficulties, and expresses himself with great force and distinctness upon the subject.

It frequently happens that in the same subject, the gums and the periosteum are affected with inflammatory and suppurating diseases, the sockets and maxillary bones with inflammation, supuration, and mortification; while, at the same time, a great number of the teeth are suffering from various disorders in their bony structure, and from chronic and acute inflammation in their lining membranes. These diseases may be excited simultaneously by a considerable number of dead and putrified roots and teeth, by tartar, or by many other local and general causes. Sometimes certain teeth may suffer from many local diseases at the same time, and yet it may be very possible, and even very necessary, to attempt their preservation. I have frequently seen such teeth locally affected in five or seven different places, while each individual disease has required a separate operation; and I have by a careful treatment succeeded in preserving such teeth for a long time. See Cases 18 and 41.

The difficulty of deciding where to begin in such instances, and where to end, is really very great, and not unfrequently very embarrassing even to the experienced surgeon.

The principal curative means in the possession of the dentist are operations, many of which cannot be performed without producing considerable irritation; and hence, if they are performed at an unseasonable period, instead of curing the malady for which they are instituted, they serve to aggravate the disease, and to produce the most injurious effects, not only upon the teeth, but also upon the parts contiguous to them.

To effect a perfect restoration of the diseased mouth to a healthy state, almost every disease requires a different treatment, and

it is often necessary to perform a great number of irritating operations before a perfect cure of all the parts affected can be accomplished. The greatest judgment is requisite not only in proceeding in the best order with the necessary operations and remedies, but also in the skilful performance of each individual operation.

In such complicated cases, it is particularly necessary that the dentist should first inform himself of the several causes, and the manner in which they have operated, whether quickly or slowly, in destroying the parts; for, in the removal of these causes, which is not to be effected without successive operations, the ultimate success of the whole treatment almost entirely depends upon the skilful manner and judicious order in which such operations are performed.

The removal of the local causes is generally attended with more or less local irritation and pain, and, should this irritation be greater than the parts or the system in general, can support at the time, injury, rather than benefit will be occasioned by the operation, and new causes of diseases will thus be added to those already existing.

But if, on the other hand, in very complicated cases, those morbid causes, which act together upon the same parts, and which may be considered as one class or set of causes, are not removed at the same time, or at least in a short space of time, the good effect of the partial treatment is frequently frustrated, either by the loss of time, or by the irritation produced by the incomplete operations, and by the increased morbid action of the remaining causes.

The great object for the best plan of cure is not to fall into any extreme, but to avoid equally dangerous precipitation and delay.

To attain this view, it should be an unexceptionable rule, to remove in the first place such exciting causes as produce the most extensive morbid influences upon the teeth and their relative parts, and that the remedies employed for that purpose should be such as are least likely to irritate, and most calculated to remove every symptomatic inflammation in the teeth. In the second place, those causes which act more particularly upon them should be subjected to surgical treatment.

Of these exciting causes none are productive of more extensive symptomatic inflammation in the teeth, gums, &c. or, indeed, more destructive to the constitution than acute constitutional diseases: and few local inflammations occasion, perhaps, greater symptomatic derangements of the whole system and of the teeth generally, than acute inflammations of the gums, sockets, periosteum, and maxillary bones, and particularly of the lining membrane of the teeth; consequently all these acute diseases, either general or local, should be first considered in the treatment, in order ulti-

mately to secure the restoration of the health, as well of the general system as of the teeth and mouth. See Cases 13, 14, 16, and 40.

The next consideration should be the removal of the chronic symptomatic affections of the teeth and the parts connected with them, by a proper treatment of all chronic idiopathic maladies of the gums, periosteum, alveoli, and maxillary bones, which have the same hurtful effect upon the system in general, as upon the parts locally connected with those affected.

The proximate causes and the diseases of the teeth, such as caries in its first stages, irregularities and deformities of their bony structure, &c. as they produce the least symptomatic affection upon the teeth and other parts, should be the last objects of treatment; for instance, as it regards those teeth which are the chief object of preservation in the treatment, no operation should be performed upon them until they are freed from all symptomatic inflammation, and this, of course, cannot be the case while the parts or the constitution in general are suffering from any primary disorder.

Of this the following example may serve as a more particular explanation.

An individual in good health, whose gums and other parts of his mouth are healthy, and the teeth perfectly free from tartar, and every other cause of irritation likely to produce inflammation in the parts just mentioned, places himself under the care of a dentist for the cure of some teeth affected by certain local diseases, such as caries, for instance. In this case these local idiopathic diseases of the teeth being the only object of treatment, the dentist's attention will of course be directed to their immediate removal by the most direct and effectual means.

If the same patient were troubled not only with diseases of the teeth themselves, but also with diseased gums; if, for instance, the gums were found in a state of inflammation, or suppuration from the irritation of tartar, or from any other cause, or in case of any disease in the periosteum, alveolar processes, or jaw-bones being superadded, an immediate operative treatment upon the teeth would be highly improper. The teeth in such cases, as I have already observed, are always more or less in a state of symptomatic inflammation of their bony structure, on account of their sympathy with the affected parts, and consequently are not in sufficient health for enduring any operation upon themselves until such inflammation shall have been removed. Immediate preservative operations upon the teeth would, indeed, greatly aggravate the symptomatic inflammation, and produce such idiopathic disease in the bony structure as would, most probably, sooner or later, occasion the destruction of the teeth. It is worthy

of remark, that every operation intended for the cure of the local maladies of the teeth undertaken at such a time, such as filing, cutting, and stopping, would be very painful; whereas if such operations be performed at the proper time, they would occasion either very little or no pain at all. Moreover, there can be no need of any immediate operations upon the teeth, because the diseases of the gums and other contiguous parts are more extensively destructive to the health of the teeth, and more active in their destructive operations, than the maladies of the teeth themselves, as has been already explained; and any treatment of the teeth would be of no utility if the gums and other contiguous parts, intended for their support, were not also restored to perfect health. The first object, therefore, of the dentist should be the removal of the most active and extensive causes, viz. the diseases of the parts immediately connected with the teeth.

Again, should the same individual be labouring under any acute local inflammation, such as swelling of the face or gums, the acute state of which may be frequently brought on by a cold or general disorder, exciting the primary local disease of the gums or alveoli, such as fistulous abscesses of the gums and sockets, or tooth-ache; the first object of attention should be the cure of acute disease, and the other local diseases of the gums, and other parts should be left to themselves, until the acute inflammation shall have been completely subdued. When dead roots and teeth are the cause of such gum-boils or swellings, which is almost invariably the case, they should be extracted without loss of time, unless particular circumstances should render a short delay necessary. When the lining membrane of the tooth is inflamed, the first object should be to restore a healthy action to the parts; but if such inflammation be owing to causes which cannot be remedied, as, for instance, a state of suppuration, the only proper and most speedy, as well as least painful process, is the immediate removal of the tooth or teeth thus affected.

If the patient should be labouring under general acute disease, *i. e.* fever of any kind, such a malady would require the first attention. At the same time a judicious attention to the local acute diseases, with a view to produce immediate relief from pain, together with the removal of such local causes as in a direct manner aggravate the general disease, will greatly facilitate the ultimate cure, and should always be resorted to without delay. The immediate removal, for instance, of such teeth as actually produce tooth-ache, dead roots and teeth, which cause from their local irritation acute inflammation or suppuration and mortification, as well as much pain in the surrounding parts; and also of such mechanical and chemical causes as augment, by their irritation, the different maladies of the mouth, such as injudiciously

inserted artificial teeth, irritating ligatures and stoppings, which from their pressure upon the nerve, occasion great pain, will at once contribute to relieve the patient of considerable pain, whilst, probably, a part of the exciting causes of the general malady will be eradicated. But with regard to the other chronic local diseases of the mouth and teeth, I should observe, that no other than a palliative cure should be attempted, so long as the patient is labouring under general ill health.

The same treatment should be observed where such general or local chronic disorders are present, as from their severity, or the excess of debility produced by them upon the system, oblige the patient to confine himself to his bed or room; for the effect of such chronic disorders is not materially different from that of acute diseases; the mouth and its component parts, under such circumstances, being always in a considerable degree of symptomatic inflammation, or in a very tender and irritable state.

Of the Author's Principles and Method of Curing the Diseases of the Teeth and their Relative Parts.

Having observed that the cure of the diseases of the teeth and gums depends upon a judicious and skilful removal of their causes, as well as particularly upon the order, and successive time of such removal; I shall now divide these causes into different classes according to their activity, and the power with which they excite the diseases, and promote the destruction of the parts affected.

These causes are either acute or chronic, and these are again subdivided into general and local.

All acute diseases of the system, whether general or local, act more speedily and destructively upon the teeth and gums than any other causes; and of local diseases, those of the mouth in particular. The latter produce the greatest symptomatic inflammation of the different parts of the teeth and gums; and as they are also, in most instances, not a little painful, they should be first attended to.

The dental treatment at any period of an acute disease of the general system, accompanied with pain and other symptoms of acute disease in the teeth or their relative parts, should never be more than partial, amounting only to the removal of such causes of the local maladies of the mouth, as are presumed to produce immediate pain or acute inflammation; and this should be done in the most cautious manner.

Even when chronic maladies have so much affected the patient as to have confined him to his bed or room, and to have been accompanied by acute inflammation of the gums and teeth, it will be proper to observe the same treatment.

But when the disorder is not of that violent kind, the whole system will be greatly benefitted, not only by a removal of such local exciting causes as occasion the acute and painful diseases, but also by the additional removal of all presumed causes of chronic maladies of the teeth and gums; and this treatment should be accompanied by a proper and judicious regard to the state of the general health and constitution. See Cases 13, 14, 16, 24, 28, 29, 30.

These principles should be particularly observed in respect to females in time of pregnancy or suckling, inasmuch as a cautious and judicious treatment of the teeth and gums will not benefit the health of the mother only, but also that of the child, and even the future soundness of the latter's teeth.

The existing prejudices against the treatment, here recommended, are entirely founded on the malpractices of ignorant and daring men, or on the timidity of unskillful operators; and hence, the prevalent notion that it is better to suffer from a slight disease, than from a painful and hazardous dental treatment.

I have, however, in no instance been deterred from performing any operation, of which the necessity was sufficiently indicated, by the circumstances of pregnancy, nor by that of suckling, provided the individual was willing to submit to it; and particularly in those cases where it was to be instituted with a view to relieve the patient from immediate suffering.

CASE XII.

In the year 1819, in the presence of William P. Dewees, M. D. and Lecturer of Midwifery, &c. of Philadelphia, I extracted fifteen decayed and dead teeth and roots in the space of twenty-five minutes, from the mouth of a lady who was, I believe, in the fifth month of her pregnancy, and the result was immediate relief and eventual benefit to the health of the mother, and impunity to the health and life of the child.

This case and many others which occurred under the immediate observation of two of the most eminent accoucheurs of the United States, viz. Nath. Chapman, M. D. and Prof. of the Instit. and Prac. of Medicine in the University of Pennsylvania, and Dr. Dewees, whom I have already mentioned, had in a great measure the effect of removing the prejudice against dental operations during pregnancy, from the minds of the liberal members of the Medical Faculty in Philadelphia; a prejudice too frequently entertained, not only by the public at large, but by physicians and surgeons; and generally productive of much suffering to the mother, and no doubt of injury to her child yet unborn.

The effect of such a treatment depends in a great measure on the judgment and skill of the dentist; and in the absence of the

required skill and judgment, the individual would necessarily be exposed to the danger of the malpractices of dental surgery, and especially of the barbarous methods in which the various operations are so frequently performed.

In the conduct of such operations, it would be the obvious duty of the dentist to watch carefully the immediate effects of such operations, both upon the mind and upon the body of his patients, and to judge how far their powers might be capable of supporting the unavoidable irritation and pain produced by them; a duty, however, of which the performance could not be reasonably expected from a mechanical and ignorant operator.

In cases requiring dental treatment exclusively, the general health being supposed good, the removal of all acute diseases of the teeth and of the parts subservient to them, to be accomplished by the removal of their respective causes, should be the first care of the dentist, and it should invariably precede every other operative treatment.

When the mouth is not affected with any acute disease, the first object of the practitioner should be to restore the maxillary bones into a perfect state of health and regular action, as the primary diseases of these parts are, in cases of this kind, the most dangerous and the greatest exciting causes of the diseases of the teeth, and are invariably productive of much symptomatic inflammation and tenderness in their lining membrane and bony structure, as likewise, in the gums, periosteum, and alveoli.

The alveoli and periosteum ought to receive our next consideration, as, from their immediate connection with each other, they are always more or less affected at the same time by the same causes of disease, and consequently benefitted by the same remedies and operations; though such diseases may have originally begun and produced their most violent effects in one only of the alveolar structures in question.

Inflammation, suppuration, mortification, or caries, &c. in these parts are very common affections. Gum-boils are diseases more properly of the alveoli than of the gums, as they being first in the sockets and periosteum.

The gums are the next objects of dental treatment. By a proper attention to the primary diseases of the alveoli, periosteum, and maxillæ, these parts are always greatly benefitted, and so, also, a successful treatment of the diseases of the gums reciprocally benefits the sockets.

The diseases which most commonly affect the gums and the periosteum, are inflammation and suppuration, scorbutic excrescences, spongy abscesses, &c. all of which ought to be perfectly cured by the complete removal of the causes which are generally tartar, dead roots, and decayed teeth.

When all the parts connected with the teeth are restored to perfect health, when they suffer neither from debility nor from relaxation, but are strong and vigorous, then, and then only will the diseases of the teeth become altogether local, and the teeth themselves free from all symptomatic inflammation, and even from susceptibility of diseased action of any kind. This is the time to proceed, with the most certain prospect of a permanent success, in the separate treatment of every local disease of the teeth individually.

In the treatment of the teeth respectively, considerable judgment may sometimes be required to manage the case most beneficially to the patient.

Particular care should be taken that those operations, which produce the least irritation on the nerves of the teeth, and on the periosteum, should be first performed, or that such diseased teeth, as are of minor importance and possess the greatest physical strength, should be first treated; because every individual operation being contributive to the success of the next, the last is of course performed under the most advantageous circumstances, and, therefore, the most likely to prove successful.

By such a proceeding, the most extensive dental treatment becomes a series of operations, each of which is made auxiliary to the next; until, at length, each individual part, and finally the whole mouth, is restored to perfect health.

No local disease, however apparently trivial, should be permitted to remain in any tooth or part of a tooth, for as long as any disease, however confined as to its locality, is allowed to remain, no perfect cure can be obtained. The most trifling caries, thus neglected, would not only inevitably destroy the tooth affected by it, but would gradually render the whole mouth diseased, and, combined with other causes, it might even lead to a total destruction of all the remaining sound teeth.

Artificial teeth, obturators, &c. stand in a much nearer relation mechanically to the other parts of the mouth, and remaining living teeth, than any other artificial part to the defective and corresponding natural one.

But as to their chemical effects, these artificial parts exert a far greater morbid influence upon the system in general, as well as upon the living teeth, and upon the parts with which they are brought in contact, than any other artificial parts used in surgery, from being constantly subjected to the greater or less decomposition and chemical action produced upon them by the saliva, even when inserted under the best surgical principles.

The same rules, therefore, which are adopted in the application of artificial parts in surgery, should certainly be observed in the insertion of artificial obturators and teeth.

In consideration of the important mechanical and chemical effects produced by artificial teeth, &c. upon the mouth, and those produced upon the system by the saliva, absorbents, and stomach, as well as by the injury which the lungs may receive from the breath, when affected by any neglect or carelessness in their insertion, it ought to be regarded as a rule, never to insert a single tooth until all the teeth and other parts of the mouth are restored to perfect health. See Cases 2, 3, 4, 5, 14, and 15.

In cases of complicated diseases of the teeth, gums, periosteum, alveoli, and maxillæ, and when such affections are primary and principal exciting causes of constitutional disorder, the practical principles to be observed by the dentist, in conjunction with the medical attendant, are not different from those mentioned, but they require the utmost nicety and delicacy in their application.

One of the greatest and most perplexing difficulties, which the dentist has to overcome in such cases, is the debilitated and irritable state of the constitution and mind of the sufferer; and sometimes the greatest ingenuity and knowledge of the human heart, and the most active and tender persuasion are required to calm the fears, and to rouse the spirits from despondency to the necessary fortitude and resolution.

Professional skill and perseverance, however, aided by the advice of an experienced and well-informed physician to conduct the constitutional part of the treatment, will seldom or never fail to lead to the desired end, namely, a perfect recovery of health and moral happiness.

I once saved a lady who was in a most delicate state of health, and suffering greatly from nervous irritability, and the most appalling fear, as to the consequences of her case, as well as to the operations necessary for a cure, by bestowing nearly a day and a half of my time exclusively for her relief. I effected at last the removal of seven roots and teeth in a few minutes time. Tears of joy and gratitude on the part of the patient, and the most lively friendship and esteem of a very extensive and respectable family and circle of connexions, were the ample reward of my successful services in her behalf. See also Cases 3, 9, 10, 11, 13, 14, 16, and 24.

If the symptomatic disorder should be of great extent and of an acute nature, it will rarely be permanent, or for any length of time accompanied by acute and very painful diseases of the teeth and mouth.

The safest plan, therefore, in such cases, is to embrace the first favourable period of the general disease for the performance of such dental operations, as may be necessary to the removal of the most powerful local causes of the various maladies of the alveoli and maxillæ, and of the inflammation and suppuration, or

any other diseases of the periosteum, gums, or of the teeth themselves.

These causes are almost invariably dead roots, and dead or diseased teeth, of which the lining membrane being either destroyed or exposed to external irritation and consequent inflammation, they act as powerful morbid exciting causes upon the nervous system.

Such teeth also as are irregularly situated, or so deprived of their contiguous parts, as, sockets, periosteum, and gums, as to become by their looseness, irregular situation, or in any other way, the causes of irritation, though they should be perfectly sound in their bony structure, are, and will continue to be, as long as they are suffered to remain, the most powerfully exciting causes of the maladies of the mouth, as well as indirect causes of symptomatic diseases of the general system.

If the local disease is supposed to affect the sockets and the periosteum of the teeth primarily and principally, all the large grinders, having no antagonist in the opposite jaw, should be extracted. It may, indeed, be sometimes expedient to extract the small grinders under the same circumstances, even if they are not loose, because there is an uncommon predisposition in the periosteum of becoming generally diseased at such a time, owing to the absence of the stimulus produced by the opposite tooth in mastication; and while the disease is going on in the periosteum of such teeth, it will either prevent a perfect cure in the other parts, or very soon produce a relapse of the disorder, which will be more difficult to overcome than the first attack. See Chapter III. on the devastation or Absorption of the Gums and Alveoli.

Teeth, however, which are sound, or even in such a condition as to permit their being rendered so by art, provided they are firm in their sockets, or can be rendered so by proper treatment, and are sufficiently regular, should never be extracted, however tender and painful they may be. Such pain must always be considered as symptomatic, and may be remedied by curing or removing the idiopathic disease.

I have known many instances where such teeth have been extracted from an erroneous apprehension of the existence of a disease at the root of the teeth, such as exostosis, necrosis, or spina vetosa, which have been described by Fox in his *Natural History of the Teeth*, part ii. p. 41. But such diseased state never, in fact, exists, except in teeth affected by caries or some other visible disease, which I shall sufficiently prove at some other time.

For the present I shall content myself with assuring the reader, that during a practice of fifteen years I have never seen a case of such a diseased state of a tooth as Mr. Fox describes and exhibits in his engraving, excepting where the teeth were considerably affected by some other primary disease.

Such appearances and diseases are either natural formations, or secondary affections, produced during the slow process of caries, or the effect of chemical influences of the diseases of the periosteum and socket, such as have been already mentioned. These real causes seem to have been overlooked by Mr. Fox, for reasons not necessary for me to discuss.

To be certain of a speedy and perfect cure of such complicated cases, it is of the greatest importance that every tooth and root, which it is requisite to extract, should be removed at the same time or sitting, so that a repetition of these more apprehended, than really painful operations, may be avoided; a principle I have almost invariably endeavoured to pursue.

By this practice, the curative effect is greatly enhanced in two ways: first, by augmenting the local and general advantages derived from these operations; and, secondly, by the great composure which the completion of these dreaded operations produces in the mind of the patient, which is generally as much affected as the physical state of health: whereas by a distribution of these operations into several sittings, their beneficial effects are not only greatly counteracted and diminished, but frequently overcome by increased action of the remaining morbid causes. The unavoidable pain accompanying the succeeding operations is also increased by the increased morbid action, resulting from the previous incomplete operations; and by the great anxiety, and particularly painful anticipations and fear which are left with the nervous sufferer; who, finding no relief from partial treatment, either despairs altogether of the possibility of a cure, or from a debilitated state of mind and body, is not capable of overcoming his apprehension and irresolution; in consequence of which a cure is altogether defeated.

I have but rarely met with such a disappointment, and in those cases in which my opinion has not been acted upon, it has in general been owing to the excess of parental or friendly affection of too-officious bystanders, or to the groundless apprehension of dangerous consequences on the part of the medical attendant, to my own great mortification, as well as to the serious disadvantage of the suffering patient.

This first and most important part of dental treatment having been accomplished, the patient will almost immediately improve in physical and moral health and vigour; and, convinced of the efficacy of the remedies, will be very anxious to submit to any further treatment that may be necessary for a radical cure of all the other local diseases of the mouth; this being the only means of preventing the relapse of the constitutional disorder, and consequent total loss of the teeth.

The further radical cure may be effected with certainty and safety in the same manner, and on the same principles as those

which have been stated in the preceding pages; and the general system, by a proper attention, so restored to health and strength, as to prevent any relapse of the idiopathic or symptomatic disorder.

A strict adherence to the above principles will be found to have been observed in Cases 9, 10, 12, and 19, and in the following, which I have annexed at full length.

CASE XIII.

Mrs. B——, a lady of Philadelphia, of about thirty-eight years of age, had lived a great portion of her life in a remote part of the country, where no surgical aid could be obtained for the teeth. She had often suffered greatly from tooth-ache, and had taken continual recourse to palliative remedies; such as, all kinds of narcotics, tinctures, essential oils and various acids, &c. for temporary relief. But these means only palliated the local pains; the general morbid action of the parts was always much increased and greatly hurried on in its destructive progress by these temporizing expedients. For several years her whole constitution had been greatly affected, she had been obliged to keep her bed frequently for weeks and months together in consequence of the diseases of her mouth; which produced inflammatory rheumatic attacks, severe pains in her ears, jaws, and head, accompanied sometimes with fever, and followed by dyspepsia, emaciation, and various derangements of the general health.

She had been living in Philadelphia for several years, and her husband, who was much concerned at her painful situation, had previously informed me of her intention to consult me when her teeth should become troublesome again, and particularly request me to endeavour to effect a radical cure.

December 10th, 1819. This lady visited me with the view of having a tooth extracted, which at the time was extremely painful. On examination, I found that the lining membranes of many of her teeth were exposed. All the other teeth had either lost their crowns, or were so completely past cure as to give me no hopes of saving any of them except the four incisors, two cuspidati, the left bicuspidatus in the upper jaw; and the four incisors, two cuspidati, and the two first bicuspidati in the under jaw; which were in a less diseased condition. Her gums were greatly suffering from chronic inflammation, fistulous abscesses, and gum-boils in different places: many of the alveoli, and some parts of the jaw bones, were in a state of suppuration and mortification. Her teeth were incrustated with tartar, throughout almost all their surface, and her breath was exceedingly offensive.

To effect a complete and permanent cure of all these complicated diseases, it was necessary to extract every root and tooth which had lost its vitality, or was incapable of being preserved.

The number of these was very great; for the patient had never had any tooth extracted since the second dentition.

With the hope of being restored to perfect health she submitted to my plan, and she had twenty-two teeth and roots of teeth extracted in the course of forty minutes. She was directed to use a weak stimulant lotion for some time after the operation in order to cleanse the gums.

In about two months her mouth was restored to complete health, and the general health has since been uninterruptedly good, to the greatest gratification of a fond husband, and a family of nine children.

CASE XIV.

Mrs. A——, of Charleston, S. C. a lady of great respectability, consulted me respecting her teeth, on August 16th, 1817: she gave me the following account of her case.

About fifteen years ago her teeth were all sound and healthy: but having unfortunately consulted a pretended dentist, who had arrived in that city, she was persuaded to submit to a course of operations upon them as a preventive treatment; and operations were performed upon nearly all her teeth, many of which were injudiciously filled. From that time they began to grow tender and painful, and some of them decayed. She was afflicted, year after year, with a violent tooth-ache, till all her teeth and gums appeared to be in a state of general disease. After four or five years' suffering, the pain in her teeth went off; but her gums and face became swelled, and chronic pains in the jaw and other parts of the mouth ensued. These symptoms continued to increase for several years, until her whole constitution became greatly disordered. At length, she was frequently afflicted with the most violent rheumatism and with nervous affections of various kinds, accompanied with fever and derangement of her digestive organs, with frequent darting pains in her head, and particularly in her ears, which discharged a yellow matter. Her hearing was at times much affected, and all those distressing symptoms were changing from the acute to the chronic, and from the chronic to the acute state; so that for the last five years, she had never enjoyed even a tolerable state of health, being always more or less in pain, and often confined to her bed or chamber for many weeks, and, sometimes, for many months. All the assistance that medicine or medical aid could afford had been tried without effect; and at last, induced by the advice of her physicians, she undertook a journey of seven hundred miles, and came to Philadelphia with a view to obtain better surgical assistance.

The lady was about forty years of age, naturally of a very strong constitution, and rather inclining to fatness, but her com-

plexion was exceedingly pale and sallow, and her face much emaciated. Her mouth was in a frightful condition. Her teeth had been all destroyed except four under incisors, and two cuspidati. The rest were absolutely rotten or wasted away, and nothing but the roots and, in some places, a decayed and crumbling crown were left. The gums, periosteum, and alveolar processes, and even the maxillary bones were all diseased, and, in some places, in a state of mortification. Some parts, however, were in a state of chronic inflammation, and others in a state of suppuration, discharging a yellowish green fetid pus. Her breath was exceedingly disagreeable, almost insupportable. She observed, however, that her general health at that time, was rather better than usual, as it was the most favourable season for the state of her health.

Having thoroughly examined the condition of the mouth, I felt happy to cheer her spirits by assuring her that I should be able to restore her mouth to perfect health, and thereby to re-establish her general health: in consequence of which she acceded immediately to the plan of the cure which I proposed.

I began by removing all the dead and painful teeth and roots, which were the exciting causes of all the diseases of the mouth, and also of the symptomatic maladies, in order to restore a healthy action to the parts generally, until I should be able to attend to the teeth particularly.

August 16th, 1817. Seventeen teeth and roots were removed from the upper jaw. The removal of those of the under jaw was deferred, as the lady was not willing to endure all the operations at once, which, however, would have been much better for her, though she erroneously apprehended that it would weaken and fatigue her too much. Warm, slightly astringent, and stimulating lotions were used for the cleaning of her mouth after the first operation.

August 25th. The absorption of the gums and alveoli, whence the teeth had been removed, was proceeding rapidly, and the patient was comfortable. A nourishing animal diet was prescribed, and her dyspeptic symptoms attended to.

September 6th. Nine roots and teeth were extracted from the under jaw, and the lady at the same time expressed her great regret that she had not submitted to my advice to have all the decayed teeth and roots extracted at the first sitting, as she had experienced all the unpleasant effects from the delay which I had apprehended. The same treatment was pursued after the operations, as before.

September 16th. Her mouth was now rapidly improving in health, the absorption of the alveolar processes was going on regularly, and the patient was in excellent general health and spirits.

September 25th. Her front teeth were scaled, and freed from all tartar and injurious mucus.

October 23rd. The dead and diseased parts were extirpated from the right under cuspidatus, the lining membrane being unavoidably exposed, and the dental artery wounded, this membrane was treated accordingly, and the cavity stopped with gold. The caries of the left cuspid, and of two of the incisors, was removed by filing.

October 27th. The patient was now in complete health, her remaining front teeth, the incisors and cuspidati were all perfectly well and comfortable, her mouth was free from all morbid action, although the absorption of the alveolar processes was not entirely accomplished, but going on satisfactorily.

On account of some family affairs, the patient was unable to continue her visit until the absorption of the alveolar processes was sufficiently completed to introduce a set of artificial teeth, and she left Philadelphia, intending to return the following summer for this purpose, at which time it would be more safe and judicious to insert them. There was now great improvement in the appearance, as well as in the general health of the patient. Her complexion had changed from sallow to fair and healthy, her eyes were bright and clear, her hearing also was completely restored. She left me with tears of joy and gratitude.

In the summer of 1818, she paid a second visit to Philadelphia, when she was in perfect health, and her remaining six front teeth were in good order, white and beautiful; the right cuspidatus, of which the lining membrane had been exposed and wounded, was also alive and healthy.

September 29th, 1818. A double set of artificial teeth was introduced, and she soon became so accustomed to them that they could not be distinguished from her natural teeth, except by those, who, being apprized of their insertion, were led thereby to observe it. Since that time I have continued to supply this lady with the necessary materials for the preservation of her remaining six teeth, and have the gratification to know, that in the last year of my residence in America, she was in excellent health, and her natural teeth unimpaired in beauty and strength. Her artificial teeth were also doing well in the summer of 1822.

CASE XV.

Miss D. a lady of great respectability, from Tennessee, by the recommendation of her cousin, residing at the same place, who had been previously under my care, consulted me about her teeth. This lady undertook a journey to Philadelphia, of upwards of thirteen hundred miles, for the sole purpose of obtaining the best advice for the cure and preservation of her teeth; an in-

stance well calculated to prove the great value attached by the Americans to the preservation of their teeth. The patient was about twenty-eight years of age, and of a good constitution; but nothing had been done for her teeth, from her unwillingness to trust them to the care of the dentists in that part of the country where she lived, having seen, in some instances, the pernicious effects of their practice. Her mouth was under the influence of chronic disease, and she had frequently suffered from the tooth-ache. The greater part of her teeth were decayed, and some were in such a state as to render their restoration impossible. Her upper four incisors were entirely destroyed by caries, and some parts only of their roots were remaining.

I proposed the removal of those teeth and roots which were dead, and the proper measures for restoring the other parts of the mouth and the remaining teeth, to a perfectly healthy condition, and subsequently to supply the want of the four front teeth by an artificial set. The lady willingly acceded to this treatment.

May 26th, 1817. Nine teeth and roots were extracted.

June 4th. The tartar was removed from the remaining teeth, and proper attention to cleanliness afterwards observed.

June 18th. The caries, in two places, was removed by the file and cutters, and extirpated in two others in which the cavities were stopped with gold.

June 21st. The caries was filed away from two teeth, and two cavities freed from caries by extirpation, and plugged with gold.

June 26th. The caries in two places was extirpated, and the cavities filled with gold.

July 1st. The caries in two places was cut away with the file, and three other carious cavities prepared and stopped with gold.

July 5th. The caries in three places was extirpated, and the cavities plugged with gold.

July 22nd. The caries in one part was removed by the file, and three cavities filled with gold.

July 23rd. Three cavities were freed from carious matter, and plugged with gold.

August 15th. The gums and the other parts of the mouth being in perfect health, and the absorption of the alveoli of those teeth which had been taken out being fully accomplished, and followed by proper cicatrization, a ridge of the gums being formed over those parts, and all the teeth being cured of every possible blemish, a set of artificial teeth, constructed of natural teeth, mounted on gold plates transversely, and fastened by springs or clasps to the other teeth, was inserted. Every attention was paid to make them fit firmly, so as not to occasion injurious pressure against

the gums or the periosteum of any of the other teeth, and to prevent their contact with the opposite teeth, in any possible situation of the mouth. The patient left Philadelphia in perfect health, with a promise to return whenever a new set of artificial teeth should be required; this, however, was deemed unnecessary before the expiration of about five years. I had the pleasure to know that she was living, not long before my departure from America, in perfect health, although in a part of the United States generally regarded as very unhealthy.

CASE XVI.

Miss G. of Philadelphia, about sixteen years of age, was troubled with a complaint in her ears, attended with severe pain and discharge of yellowish matter from them, difficulty of hearing, much general debility, and great depression of spirits. No means had been omitted to obtain the best medical and surgical advice; but it had been utterly unavailing. Her father, and the greater part of her brothers and sisters were also hard of hearing, and some of them were sometimes troubled with a like discharge from the ears, although not to such an extent, nor accompanied with such severe pain. The case was consequently regarded as incurable, and supposed to be owing to some natural defect in the organization of the parts.

Nov. 23rd, 1818. She consulted me with a view to obtain relief from the tooth-ache, by the advice of her brother, one of the few members of the family possessed of a perfect hearing. He had been some years previously under my care, and was greatly impressed with the belief that the health of his teeth was one of the principal causes of the preservation of this sense, and for this reason he was induced to believe that the sufferings of his sister originated from the diseases of her teeth.

I found her exceedingly agitated, and so full of apprehension that she actually wept; and I had the greatest difficulty in persuading her to let me look at her teeth. Having been previously apprised of the nature of her malady, I had already begun to suspect it was owing to diseases of her teeth, particularly as she had been under the care of the most eminent surgeons and physicians, who, I had every reason to believe, would have been successful, if the disease had not been symptomatic. This opinion seemed confirmed by observing, that there was no visible defect in the organization of the ears, and by the reflection, that if any defect did really exist, it was not likely to produce symptoms so violent as those present, however it might affect the sense of hearing.

After a little consideration, I gave my opinion, that there was great reason to hope for a complete recovery, if she would allow me to investigate the case more minutely. The effect of hope

was wonderful. She readily permitted me to examine every tooth, and every part of her mouth very particularly.

Her teeth were, generally, under the influence of caries, and the disease had penetrated to the cavity in some of them. They were all more or less encrusted with tartar, her gums and the sockets of her teeth were in an inflamed state, and bled at the slightest touch. The left under second large grinder was carious and painful, and the opposite one was also carious, and the crowns of the two upper second bicuspidati were nearly destroyed. There was but little room for the *dentes sapientiæ*, and knowing that in the warm and changeable climate of America, their formation is frequently hastened at a premature age, particularly in delicate and irritable constitutions, I readily suspected that their precocious formation, and the want of room for them to pass through the gums in combination with the diseases of the teeth, were the causes of the inflammation, and the pain in the ears.

After this examination, I proposed to extract one of the upper second large grinders, assuring her at the same time, that I confidently hoped to obtain a complete cure. She submitted, with some reluctance; but that tooth being removed with very little pain, she consented to have the opposite one also extracted, and afterwards, the two under second molares, as also the two upper second small grinders; so that, in less than ten minutes, this timid and delicate young lady, who a short time previously was ready to faint at the sight of a dentist, voluntarily submitted to the extraction of six teeth at one sitting.

The discharge from the ears continued; but her hearing began to improve, and the pain to subside, in a few days after the extraction of the teeth.

December 15th. The tartar was removed by scaling and perfectly cleaning the teeth.

The discharge from the ears had visibly diminished, and was unattended with pain; her hearing much better; but she could not hear so well with the left, which had been most affected, as with the other, the left grinder had been the most painful tooth. A wholesome, nourishing diet, consisting chiefly of animal food, was advised, and every attention paid to the regularity of the *primæ viæ*.

Dec. 24th. The patient was in excellent health and spirits, suffered no pain, the discharge from the ears had subsided, the hearing was much improved, and the gums and teeth were in such a state as to admit of further curative measures. The caries was removed, in one place by the file, in two others by extirpation. One cavity in which the nerve had become exposed, was treated accordingly, and both cavities plugged with gold.

January 8th, 1819. Two carious cavities were properly prepared, and plugged with gold.

January 16th. The caries was cut and filed away in three places, two cavities were freed from the diseased bone, and plugged with gold.

When the patient visited me the next time, which was in the following April, she was labouring under the effects of a violent cold, which she had caught about six weeks before, and which was followed by a recurrence of the inflammation of the ears; but not in so violent a degree as formerly. There had been a small discharge, and the hearing was slightly disordered. At the end of two months, however, the patient's hearing was restored, excepting that of the left ear, which remained somewhat imperfect.

April 2nd. The caries in two places was filed away, and in two others extirpated, and the cavities plugged with gold.

April 29th. The caries was extirpated in two places and the cavities were filled with gold after the lining membrane of one, which had become exposed, had been properly treated.

May 20th. The caries was removed in two places with the file, and from another was extirpated. The cavity filled with gold.

June 17th. Superficial caries was filed away in two places; in four others the deep seated caries was both filed and cut out, and the cavities were filled with gold; the nerve in one, being exposed, was treated accordingly.

These measures were followed by great improvement of the general health, cessation of pain in the ears, as well as of the discharge from them. The hearing was good, but not quite so acute in the left as in the right ear. The gums and teeth were perfectly sound and beautiful. Care had been taken to preserve their natural shape and appearance, and particularly to prevent the stopping being visible on the exterior surface of such front teeth as had been filled.

Before I left Philadelphia in 1822, I saw the patient frequently. Her health and spirits were good, and her hearing, if not perfect, was as good as that of any other member of her family.

CASE XVII.

Miss E. a young lady, of New York, about the end of the year 1818, was afflicted with exceedingly violent tooth-ache in the first large grinder on the right side of the under jaw, and applied to an eminent surgeon-dentist of that city, to have the tooth extracted. But he refused on account of some irregularity in the situation of the tooth, telling her, that the operation would be exceedingly difficult and dangerous, that she would not be able to bear the unavoidable pain, that he might break her jaw, &c. This intelligence made her blood run cold, as the young lady expressed herself, and for a time completely put a stop to the pain; the parox-

ysm, however, returned the next day, and she had the good sense and courage to disregard the opinion of this dentist, and apply to another more celebrated for his particular excellence in the extraction of teeth. His opinion was, if possible, more intimidating than that of the former. He told her he could remove the tooth, only by splitting it into two parts with a chissel and hammer, which would be attended with very great pain and danger. Discouraging as these opinions were, yet she would not give up the idea of having the tooth removed, as she found the other teeth becoming affected by it, and at length she wrote to a relation in Philadelphia, stating her case, and desiring my opinion, which I gave without any hesitation, assuring her, that if the lady would come to Philadelphia, I would remove the tooth with the least possible pain, without any danger whatever, and restore her mouth and teeth to a state of complete health,

She came to Philadelphia, and on examination I found nearly all the upper teeth, and particularly the incisors, cuspidati and bicuspidati in a carious state; but not so much so as to be incapable of being completely restored to health. To put an end to the great anxiety of the patient respecting the painful tooth, I proposed to remove it immediately. She acceded, and it was extracted in two or three seconds, and with so much less pain than she expected, that she would not believe the operation was accomplished until I put the tooth into her hand. The consequence was, naturally, a removal of all fear and apprehension: she desired me to remove every tooth that she suspected might be painful at some future time; and it required more address to dissuade her from having too many teeth extracted, than was requisite to induce her to undergo the first alarming operation. It was only necessary to remove one or two more teeth at that time, and the lady returned home with the intention to visit Philadelphia again the following spring, to place herself under my further treatment.

May 25th. 1819. Miss E. having returned to Philadelphia, all the teeth were scaled, and freed from tartar and other extraneous matter.

May 29th. The carious parts of two diseased teeth were filed and cut away, the diseased parts of three others were cut out, and the cavities stopped with gold.

June 2nd. The decayed parts were extirpated from four cavities, which were then filled with gold.

June 3rd. Two places affected with caries were made sound by the file; three others were cut out, and the cavities plugged with gold.

June 4th. Three places affected with caries were cleared by the file or cutters, and one by cutting out, and filling the cavity with gold.

June 9th. The caries was cut away with the file and cutters from five places.

By extirpating the caries from the left upper central incisor, the lining membrane became exposed, and was treated accordingly, and the cavity was stopped with gold.

November 30th. The patient came to Philadelphia a third time. The caries in two places was removed by the file and cutter. In two others by extirpation, and the cavities were subsequently filled with gold; the cure was thus perfectly completed.

In the year 1821, I had the pleasure of seeing this amiable young lady; when I found her teeth in complete order, and her general health and spirits in a most excellent condition.

CASE XVIII.

Miss F. of Lancaster, about twenty-two years of age, of a robust constitution and a plethoric habit, had never lost any of her permanent teeth, although almost every one was more or less diseased, or carious and covered with tartar. The gums were rather scorbutic, much swelled, and red, and her breath very offensive.

As I was on the point of leaving the United States, the patient was very anxious to lose no time in undergoing that course of treatment which I might propose, and, as we both had motives for proceeding with the least delay, the operations were performed more rapidly than I should have done under other circumstances, but not with less success, as will be seen in the sequel.

I endeavoured to preserve all her teeth, except the four first large grinders, and the two upper wisdom teeth, some of which were so far destroyed by disease as to have lost their crowns and vitality, the roots only remaining.

April 10th, 1822. These nine roots and teeth were extracted.

April 16th. The teeth were scaled, and the greater part of the tartar removed.

May 20th. The same operation was repeated, and the teeth were rendered perfectly clean.

May 26th. From two cavities in the the upper second large grinders on the right side, the caries was extirpated, and the places were stopped with gold.

May 27th. From two places in the upper second large grinder, on the left side, the caries was removed by filing and cutting, and in another the caries was cut out, and the cavity filled with gold.

May 29th. The caries was removed in one place by the file, from the anterior part of the second large grinder of the right side of the under jaw. An oblique division was made between this and the next tooth, the third large grinder, and the caries extirpated from both on their opposite sides: the second grinder on

its posterior surface, and the third on its anterior; and the cavities were plugged with gold. The second large grinder was also plugged on the grinding surface.

May 30th, A. M. The caries was extirpated in two places, from the second large grinder of the left side, in the under jaw, and the cavity stopped with gold. — P. M. The caries was extirpated from the left under wisdom tooth, and the cavity stopped with gold, and on the external side the diseased parts were removed by the file.

June 1st. The caries was extirpated from the posterior side of the right under second small grinder in one place, and the cavity was stopped with gold.

A division was made between the right under cuspidatus and the first bicuspidatus, and the diseased parts were cut out. Both teeth were stopped with gold on the sides facing each other.

June 2nd. Two divisions were made between the left under cuspidatus and the first bicuspidatus, and between the first and second cuspidati and the carious parts extirpated from both, the cavity situated on the opposing side was plugged with gold, the posterior part of the cuspidatus, and the anterior part of the first bicuspidatus were made perfectly sound by the file.

June 3rd. A division was filed between the under left central incisor and the cuspidatus, and the carious parts were cut out from the anterior side of the latter; the nerve and lining membrane having been laid bare, were treated accordingly, and the cavity was stopped with gold. Some of the under incisors were rendered sound by filing, and all the front teeth were filed to a smooth and regular surface, by which the under teeth were rendered regular and harmless to their upper antagonists.

June 4th, A. M. From the posterior side of the second upper bicuspis, on the left side, the caries was extirpated, and the cavity was plugged with gold. A division was also made between the first bicuspidatus and cuspidatus, and the posterior part of the cuspidatus was rendered sound by cutting out the diseased parts, and stopping the cavities with gold. — P. M. A division was made between the two left under bicuspidati, the caries extirpated from the sides previously filed, and the two cavities were filled with gold.

June 6th. All the upper incisors being more or less carious on their opposing surfaces, a division was made between the two lateral incisors and the two cuspidati, with the view to remove the superficial caries and diseased parts. They were also filed perfectly smooth and regular, in order to render them durable and safe. The left upper cuspidatus was rendered sound also, by extirpating the caries from a cavity situated on the side next to the left lateral incisor, and the cavity plugged with gold.

June 7th. The two upper central incisors being both carious on the sides next to the lateral incisors, the dead and diseased parts were extirpated, and the cavities stopped with gold.

The gums now, as well as the teeth, were in a perfectly healthy state. The teeth were clean and beautiful, and free from every blemish and disease.

The stopping in the front teeth had all been introduced posteriorly, or in such a direction as not to be visible in front, nor in any way without particular examination, and in the filing, the natural form of the teeth, especially of those in front, had been carefully preserved.

Fifteen different sittings, from one to three hours each, were necessary for the completion of this remarkable case. The following operations were performed.

Nine for the extraction of carious teeth and roots.

Two for scaling the teeth.

Twenty-eight for removing the superficial caries with the file and cutting instruments.

Twenty-two for the extirpation of caries, and for plugging or stopping the cavities.

One for the treatment of the lining membrane after it had become exposed.

In all, sixty-two operations.

Concluding Remarks on the Method of Curing the Diseases of the Teeth.

The foregoing rules have been my guide during a practice of several years, and have proved so certain, that I have never failed to restore to perfect health every mouth which has been entrusted to my care, when I have been permitted to follow them throughout their whole extent, and not interrupted either by the patients, or their friends, or any accidental causes.

In admitting, however, my having been occasionally prevented from adhering to my principles, I wish to be understood that I have never acted in opposition to them. No wish or entreaty, much less any peremptory request on the part of a patient, or my own private interest, has even induced me to waver, or to deviate from them, since the time I became satisfied of their truth and utility. I, therefore, only propose what I have practised myself, and what I can confidently recommend from experience.

I cannot here deny myself the pleasure of doing justice to the good sense and judgment, as also to the great patience and fortitude of the inhabitants of the United States, particularly those of Philadelphia; where I very rarely met with cases in which my patients did not most willingly submit with confidence to any course of dental treatment I considered proper, and necessary to

the restoration of health, and beauty of their whole mouth, so far as those objects were attainable. As a proof of this, I may particularly cite the instances just related in Cases 13, 14, 15, 16, 17, 18.

In London, I must candidly confess, I have frequently encountered the greatest difficulties; imputable, no doubt, to the influence of old prejudices, or to an almost total want of acquaintance amongst the public in general, with the merits and demerits of dental surgery. Yet I have, in most instances, been sufficiently successful to give the most evident proofs of the propriety of my principles; while, at the same time, I have also found that my practice daily increases, notwithstanding the temporary inconvenience to which the patient is subjected by submitting to a method of dental treatment more substantial than any hitherto known.

By proceeding in the order I have mentioned, the highest attainable degree of excellence and perfection may be arrived at in the practice of the dentist.

Every operation will be found to have prepared the parts for the next, until a perfect cure shall have been accomplished, and the utmost possible health as well as beauty of the teeth re-established. See Case 18.

Although those members of society are especially interested in the improvement of this science, who, from their more polite education and finer feelings, are most sensible of the physical and moral miseries which are inflicted upon them by the usual modes of practice, even though they might be frequently ignorant of the real causes whence these troubles originate; yet these remedies and principles are not exclusively applicable to the rich. All classes may reap the advantages of them; and even those individuals who are unable, from the want of pecuniary means, to be benefitted by such operations as are most expensive, might be able to receive such assistance as would be most needful to them; for, by observing the order laid down for them, it will be found, that those diseases which are most painful and destructive to the system as well as to the teeth and gums generally, and which require the least tedious and expensive operations, are to be first treated; whereas such operations as are exclusively directed to the local diseases of the bony structure of the teeth, and are the most expensive, are necessarily the last to be performed.

In fact, these principles are so important in my estimation, that if I could persuade my professional brethren to adopt them in their practice, I should feel assured of having contributed to the diminution of human suffering, if not my full share, at least a larger one than is the fortune of many, who endeavour to establish a system on a subject so confused and imperfect as that of

dental surgery. And should I succeed in any degree, in inducing amongst the intelligent part of my profession a greater desire for scientific inquiry and practical improvement, than is at present evinced, from which more benefit might accrue to mankind in general, I should be still more abundantly rewarded for my labours.

It must not, however, be considered from what has been stated, that the foregoing rules for the order of proceeding in the operations are sufficient, and the only necessary qualifications of the dentists, for the treatment of the many complicated diseases of the teeth and mouth.

This order is to be regarded only as the foundation, upon which the favourable result of the operations must depend ; provided they are all executed with proper judgment and skill, and conformably to those principles which are the guide for the performance of each individual operation.

I say all, because each of these operations is a link of the entire chain of treatment, which must be very imperfect or nugatory if even one be supposed to be defective or broken.

To prove this assertion, I have thought proper to give several cases at full length, and I beg to request their attentive perusal ; by which it will be observed, that in some of them, from twenty to sixty-two different operations have been performed ; the omission, or unskilful performance of a single one of which, would have been sooner or later the remote cause of many new diseases, which would have counteracted, and, indeed, ultimately frustrated the good effects of the whole treatment. See Cases 7, 14, 15, 16, 17, 18, 19, 30, 31, 42, and 44.

It is evident that, in order to apply these rules in a proper manner, the dentist should have an accurate knowledge of all the maladies of the teeth, their causes, &c. and always particularly bear in mind that a superficial view of them will invariably lead to dangerous errors in their treatment. This is even requisite in the preparation and insertion of artificial teeth ; for, though this operation belongs to the mechanical part of dental surgery, it requires considerable judgment and skill of such a kind, as is not to be acquired by labour and mere mechanical practice, but must be founded on the science of medicine and surgery.

Besides the possession of this knowledge and manual dexterity, the dentist should be provided with a proper apparatus or instruments for every operation which his professional duty may call upon him to perform, inasmuch as the success of such operations greatly depends upon their complete performance ; and this, of course, cannot be insured without the appropriate instruments for each, however expensive they may be : and no difficulty whatever should be considered sufficient to deter him from performing any necessary operation, however disagreeable or tedious, or

painful to his feelings, and even hazardous to his public reputation.

He who adopts the above principles, and has the proper apparatus and necessary qualifications, as to experience and skill, to perform every operation, and to apply every other means that may be required, will soon find that there is no insurmountable difficulty in dental surgery; and that he may justly depend upon a certain cure in almost every case.

Without, however, all the qualifications here presumed, the application of the foregoing system will be impracticable; for, if the dentist is not provided with better instruments than those usually employed for the various operations of this branch of surgery, though he should possess all the other necessary qualifications, his progress will be constantly interrupted with difficulties which he is not prepared to combat, and every operation presenting such difficulties will be either inefficiently performed, or, as is too often the case, omitted altogether.

There is not, indeed, one operation in dental surgery at present sufficiently understood; and the whole of the apparatus is in a most neglected state, and requires extensive improvements, and the addition of many instruments to insure success.

I have been repeatedly obliged to make several improvements, and to invent entirely new instruments to render the apparatus sufficient for the performance of all necessary operations.

The instruments which I use for almost every operation have been either greatly improved, or are altogether new; and my methods of performing the most important operations are widely different from those generally adopted in dental surgery. Notwithstanding this, I am not contented with the degree of proficiency at which I have arrived, for the farther I have proceeded in the investigation of this branch of science, the more I have become sensible of the deficiency of the means employed, and, of its great capability of further improvement: and considering that there are others as competent as myself, to contribute to this object, I hope that my professional brethren will be as communicative of their improvements as I am of mine, and I shall be very happy to receive any instructions from those who have made any useful inventions at present not generally known.

But with regard to that class of operators, who disgrace even the denomination of mechanical dentists, it would be most desirable, both for humanity and the honour of the profession, that they should withdraw altogether. Should such men employ their time in deep reflection and hard study, they would make the most distressing discovery, if not insensible to conscientious feelings, that their best exertions for the remainder of their days, would never be able to make amends for the havoc and destruction they have committed upon the health and lives of their fellow creatures.

CHAPTER VIII.

Of the Preventive Treatment necessary to be adopted for the Preservation of the Health and Beauty of the Teeth and Gums.

AN early attention on the part of the dental surgeon to the state of the mouth, so as to prevent the formation of diseases in the teeth naturally sound, and to preserve the health of those which have been cured by dental operations, constitutes the preventive treatment.

The prevention of diseases, or preserving the general and local health of the system, is a much more difficult part of the healing art than it might be at first supposed, though, from the simplicity of its remedies, it may appear entirely subordinate to that of curing actual disease. The prophylactic treatment of diseases must be founded upon a very extensive knowledge of anatomy, physiology, and pathology, and not only of all the diseases to which the animal frame is subject, but of all their remote and proximate causes and effects, and also, of all the means useful for their prevention or removal.

The same may be said with regard to preventing the diseases, and preserving the health and beauty of the teeth: the special object of our present attention and consideration.

To enable the dental surgeons to discover, and then to remove or counteract the causes which are produced by general diseases or local affections of the mouth, such as have been mentioned in the fifth chapter of this essay, a complete general physiological and pathological knowledge is certainly requisite; for nothing short of this will enable him to accomplish that object with a degree of certainty and safety; whereas, without these attainments his proceedings must be empirical.

It being evident from what I have already observed, that the causes of disease of the teeth are either general or local, the object of the preventive treatment should be to prevent both the general and local causes: and if in such cases the general disease cannot be prevented, it becomes the business of the physician to remove the general causes by the most speedy means, while it is the duty of the surgeon dentist to remove those of a local nature.

The general causes constituting the first class of causes of disease in the teeth and gums, can only be prevented by those means which preserve the general health.

These causes and the means of their prevention are far too numerous to be treated of in this essay; could I consider myself qualified for so difficult and interesting a task; but to this I have no pretension.

Although general diseases have not often any immediate and permanent effect upon healthy teeth; nevertheless we know that

they injure them indirectly, and are sometimes productive of such local maladies of the surrounding parts of the teeth as occasion, at some time or other, the accession of idiopathic diseases in these parts, and the consequent loss of the teeth themselves; such as, diseases of the sockets and gums, or the destruction of any indispensable parts.

While the teeth and gums are in a complete and healthy state, general diseases can be considered only as causes of symptomatic affections, or of future diseases only, but if the effects or changes which they produce are not attended to in proper time, some local disease in the structure of the teeth or gums and sockets, may sooner or later be the consequence.

In many instances, the attendance of the dentist in consultation with the medical attendant, might be very advantageous to those who set a proper value upon sound and beautiful teeth; at such a time, for instance, when the general disorder requires a long course of those medicines which are regarded as very destructive to the teeth.

In such cases, the dentist, by a judicious management, might prevent all bad consequences; even though the use of mercury or other medicines of the like nature should be the treatment adopted.

By this course of practice it would be soon known that the loss of teeth after salivation, or after the use of medicine was owing, not to the medicine, but either to the original disease for which that medicine was prescribed, or to the neglect of a timely application of proper dental assistance.

The teeth and other parts of the mouth, to be considered as proper objects of preventive treatment, must be in a healthy state, and must be naturally sound, or rendered so by judicious dental operations.

The plan to be pursued in each of these cases is the same, and is derived from the same principles. But it may be naturally supposed that such general or local causes as act disadvantageously upon the teeth and gums, must have a more active influence upon those which have been rendered sound by art, than upon those which have been always healthy and sound. The former will have a greater predisposition to disease than the latter; consequently they will more frequently require preventive treatment and ought to receive the more particular attention of the dentist.

In either case, a state of permanent health can only be effected by the early removal of such local causes as may excite immediate morbid action in the teeth, or be likely to produce diseases hereafter; and in removing all these causes, the same order and principles are to be observed which have been already recommended in the general cure of the diseases of the teeth.

These causes are physical, chemical, mechanical, or both chemical and mechanical.

The physical causes are all symptomatic or idiopathic diseases of the gums, alveolar processes, and periosteum; irregularities in the situation of the teeth and maxillary bones, or a disproportion between the jaw-bones and teeth, deformity of the teeth or of their enamel, irregularity of the grinding surface, &c.

The chemical causes are a vitiated state of the saliva, improperly used medicines, tobacco in all its forms, acid tooth-powder, tooth-paste, or tooth-opiate, tinctures, mixtures, &c.

The mechanical causes are coarse and grating tooth-powders, such as preparations of charcoal or shell; tooth-brushes not properly adapted to the state of the teeth and gums, injudicious brushing of the teeth, biting hard substances, accidental injuries, &c.

Those which combine chemical and mechanical causes together are tartar, injudiciously performed operations, and, above all, artificial teeth which have been carelessly inserted, and other causes.

The same attention to the removal of these causes is particularly requisite in every case after general disease, or after confinement in childbed, or even after suckling children. A sea voyage for any length of time, is, also, a sufficient reason for a consultation and scientific examination of the teeth by a dentist, particularly in all those instances in which the individual has been previously under a curative dental treatment. There are but few instances of the above kind, in which some morbid effects, produced by such diseases, and changes of constitution or habit, are not discovered in some parts; such as slight inflammations and suppurations in the gums and alveoli, scurvy, tartar, and mucus.

After the removal of all existing causes of disease by judicious treatment, and after the teeth and all their relative parts shall have been restored to a complete state of health, a perfect cleansing of the teeth becomes the principal means by which they, as well as the other parts connected with them, are to be preserved. A proper cleanliness, however, is not to be effected by a constant repetition of imperfect operations, as is the common practice: on the contrary, the repetition of dental operations is to be avoided as much as possible. In fact, no advantage whatever is derived from scaling and cleansing the teeth, if the operation is not perfectly performed, and followed up by the constant attention of the patient to the cleanliness of the parts. The good effects of the operation so performed, lasts but a few days, and that advantage would, frequently, not counterbalance the immediate effect of the unavoidable irritation produced in the parts.

I have, in many instances, found the constant repetition of scaling the teeth, to be one of the principal causes of disease in the gums and alveolar processes; especially when it has been per-

formed in a clumsy manner without effecting a perfect removal of tartar. The effect of such improper treatment is more hurtful than beneficial, from the irritation of those parts; whilst it is productive of only a deceitful appearance of improvement in the teeth. The operation, indeed, is always eventually injurious, unless a perfect removal of the tartar is effected, either at one sitting, or by a repetition of such operations at short intervals.

In the course of my own practice I have never been obliged to repeat an instrumental cleaning after having once restored the teeth to perfect health, except when some particular cause, as already mentioned, or great neglect on the part of the patient has rendered the repetition unavoidable. So long as it was in the power of an attentive individual to pay proper regard to the cleanliness of his teeth, himself, after I have once effected a general cure, I have always considered it my duty to keep him supplied with such medicinal and mechanical means as were precisely fit for his case, and calculated to prevent the necessity of repeating any dental operations. By this method I have almost invariably succeeded in preserving perfect health, and cleanliness of the mouth and teeth. See cases 14 and 41.

The practice so frequently adopted in this and other countries, of having the teeth regularly cleaned by a dentist, and irritated by incomplete operations every six or every twelve months, although profitable to him, is about as ridiculous and as mischievous as the exploded one of taking a strong dose of medicine once a month, for the purpose of preserving the digestive organs in a healthy state. A practice so common some centuries ago, that its general adoption gave rise to the common salutation, "*Avez vous bien purgé.*"

It is very true, however, that the kind of cleanliness which I recommend is not to be obtained by the common means in the possession of dentists generally: viz. the use of one or two kinds of tooth-powders and brushes. So various, on the contrary, are the remedies properly indicated for this purpose, that I have been frequently obliged to furnish a different sort of powder and brushes, accompanied with different directions, to each individual of several families of which I was the attending dentist.

The different ages, constitutions, and states of health of the individual, the physical and mechanical strength, and previous diseases of the teeth and other parts of the mouth, as well as operations performed upon them, are all to be considered; inasmuch as these circumstances produce a greater or less constitutional and local predisposition to diseases in the teeth and their relative parts, as well, indeed, as diseases of other and more distant parts of the system, as of the digestive organs; by which the

state of the saliva is more or less corrupted, which, from its acrid chemical action upon the teeth and gums, becomes a powerful cause of local irritation, and consequently of destruction of the teeth, and of a rapid formation of tartar.

The remedies employed in every case should be calculated, according to the different indications, to remove or counteract the pernicious effects of the causes to be removed. The means I have used are, sometimes tinctures and mixtures, but principally powders and brushes, and in these remedies I have generally found it best to combine those necessary medicinal and mechanical properties which every different case has required.

Besides the tonic astringent, and stimulant properties which tooth-powder should possess for the restoration or preservation of the health of the gums, it is a great point to unite the chemical and mechanical agencies in that exact proportion which is best calculated to preserve a perfect health and cleanliness of the gums and teeth.

It would be very difficult to give distinct directions for the use of those remedies; this must be left to the experience and discrimination of the dentist. No particular rules can be given on that subject, and all that I can lay down as a general principle is, that the more the teeth themselves are disposed to disease, or have been operated upon, the more is the mechanical agency required in combination with the chemical; and that the more the gums, alveoli, and periosteum have been diseased, and the more they are disposed to disorder, the more cautiously are the mechanical, and the more freely are the chemical remedies to be employed.

The tooth-brushes used, should be particularly adapted to every case, neither too soft nor too hard; and so formed as to clean every part of the teeth, without injuriously irritating the surrounding parts.

To suit the many varieties of cases, I have always found it necessary to be provided with a great assortment of powders and brushes, with many of the latter in such a state as to be capable of receiving any shape, to suit special and unusual cases.

Some practitioners altogether forbid the use of tooth-powders, on the ground that they are often either useless or pernicious. Such an opinion, however, can only be the result of their ignorance and incompetency for its judicious application, or from their experience of the effects of their improper use. Under such a mode of reasoning, every other important medical and surgical remedy may be rejected, and especially all dental operations. For, perhaps, none are more subject to the abuse of ignorance and indexterity than the latter. In fact, in any imperfect state of the mouth or general health, a preservation of complete cleanliness and health of the teeth and gums without powder and brushes, is as impossible as the preservation of life, without food; and

the operator who is destitute of the necessary qualifications for the proper application of these preservative means, had better reject every dental treatment altogether, for he may be well convinced that every curative remedy he applies must be much more destructive than his tooth-powder.

CHAPTER IX.

Of the Treatment of the Teeth and Gums of Children at the time of the Second Dentition.

A proper attention to the second dentition is, in some instances, nothing more than successive applications of proper preventive means for the preservation of the health of the first set of teeth, and a preparatory treatment for the future health of the permanent one.

Such is the treatment to be observed with strong and healthy children. In these cases, all that is required of the dental art is, first, to assist nature in its natural process, if it is too slow; secondly, to retard it if it is too active in its proceedings; and thirdly, to prevent all morbid influence of the temporary teeth upon those of the permanent set.

The first object is acquired by removing those temporary teeth, whose roots are too slowly or irregularly absorbed by nature; even though they should be free from disease.

The second object is attained by preserving all the contiguous parts of the remaining first teeth, and of the permanent teeth, which are already visible, in a perfectly healthy state; by which means, every unhealthy and irregular action, and consequently too rapid a progress in some, and too slow a progress in others, are prevented. By the removal, also, of all such temporary teeth as are painful, from the lining membrane being irritated by caries, and of those which have already lost their vitality; as also by strict attention to keep the mouth of the young patient in a state of perfect cleanliness.

The third object will, in some measure, be gained by the means already employed, and likewise by the extraction of such of the temporary set as are so diseased that their caries are brought into contact with the permanent teeth, particularly with their lateral surface, even though the former should be free from pain.

In addition to the above local treatment, an attention to the general constitution of the individual will be very beneficial; the enjoyment of a wholesome atmosphere will be found of the greatest importance to the future health of the young subject; and a nourishing diet, perfectly free from stimulating properties, cannot be too much recommended.

From these premises it will be observed, that caries only in its complicated stage is a certain indication for extracting the temporary teeth; and that, in my opinion, it would be very injudicious to remove indiscriminately all such teeth as are carious. It would, however, be equally improper to perform any operation for the cure of such temporary teeth; such as filing or scooping away the carious parts, or stopping cavities with metal, as is sometimes done by ignorant operators.

However simple the above treatment may appear to any one who is unacquainted with the subject, it nevertheless requires considerable knowledge of the parts, as well as great judgment and experience. Of the truth of this statement, the effects of the malpractices, so frequently to be observed by the attentive practitioner, when consulted in cases of children, afford abundant proofs.

The above treatment, however, is sufficient only when the young patient possesses a good constitution, and when the teeth of the second or permanent set are all sound and regularly situated. Cases of this description seldom, however, come under the observation of the dentist, as they are generally left to nature.

The children for whom the assistance of the dentist is most frequently sought, are those who are either in a delicate, or at least an imperfect constitutional health: where the state of not only the temporary teeth, but of the permanent also is to be considered; and where both are found diseased, the future health and regularity of the latter requires the greatest consideration of the surgeon.

Irregularity of the teeth is one of the chief predisposing causes of their diseases, and never fails even in the most healthy constitution to destroy, sooner or later, the strongest and best set of teeth, unless properly attended to. It is thus not only a most powerful cause of destruction to the health and beauty of the teeth, but also to the regularity and pleasing symmetry of the features of the face; always producing, though slowly and gradually, some irregularity, but not unfrequently the most surprising and disgusting appearance; such as, distortion of the under jaw to one side, a great elongation of that jaw and the chin, giving the face that grinning or ludicrous, and sometimes forbidding appearance, which becomes particularly evident and characteristic at some future period of life.

Especial attention should be paid to these disorders at an early period of life, for the slightest irregularity in the teeth of the child may become a sufficient cause, not only of the above deformities, but also of the ultimate destruction of the teeth.

Under such circumstances, the dental treatment of the permanent teeth become very complicated, as it is necessary, not only

to take into due consideration the diseases and irregularities of the teeth already shed, but also to judge from the state of them of what we may expect from such of the permanent teeth as are still inclosed in the gums, many of which are sometimes found at their first appearance to be affected by various disorders or irregularities. We may form an idea of the judgment which is requisite for a proper treatment of such cases, and of the embarrassing situation of the inexperienced operator, by considering that every one of the permanent teeth requires six or seven years for its formation before it perforates the gums;—that nature requires fourteen or sixteen years for the formation of the permanent set, with the exception of the four wisdom teeth; and nearly thirty years including these; and, lastly, how necessary it is to be well acquainted with the various influences, both healthy and morbid, to which the teeth are subjected during those several periods.

It is, however, a great pleasure to know, that dental surgery is abundantly provided with the most sure remedies; and that, in the most delicate subjects, if placed under proper care at an early age, the greater portion of the teeth of the permanent set may invariably be preserved in perfect health and regularity, in common with their relative and contiguous parts.

By an early and judicious application of that preventive treatment, which I have just described, to the temporary teeth, and of all the means for restoring health and order, under the principles stated in the seventh chapter, to those teeth of the permanent set which have perforated the gums; and by judicious preparatory measures for a proper surgical treatment of such diseased teeth as have not been shed, I have never failed, even in the most delicate child, to obtain such a set of healthy and beautiful teeth as might be preserved during the whole of life.

The preparatory measures consist chiefly in preventing a crowded state of the teeth, an object often to be obtained by extracting some of the permanent set at an early period, in order to give sufficient room for the rest; it is, therefore, a matter of great importance to know which teeth should be extracted for this purpose.

Those teeth which are most subject to disease, least important, and the removal of which would afford the most relief to the whole set, are the proper ones to be chosen for extraction.

As the loss of the incisors and cuspidati greatly disfigures the set, they ought to be always preserved if possible; and I have hardly ever seen a case in which it was necessary to extract any of them with the view to give room to the rest, where an early attention had been paid to the state of the teeth.

The preservation of the bicuspidæ also should be a matter of particular consideration; and the usual practice of extracting the

first bicuspid teeth to make room for the cuspidati, ought to be avoided, as well as the removal of the lateral incisors, by an early treatment.

The first molares are generally most predisposed to disease; they are least important, as it regards both appearance and utility; and so situated as to afford, by timely removal, sufficient room for the anterior teeth, as well as for the second and third molares. If these teeth are extracted at any period before the age of twelve years, all the anterior teeth will grow more or less backwards, and the second and third grinders so much towards the anterior part of the mouth, as to fill up almost entirely the vacant spaces caused by the removal of the first molares.

In almost every instance, all irregularity will be prevented by this treatment, and all the teeth will take a proper situation. But, besides this advantage, another more important benefit will invariably follow; viz. all the teeth will be improved in strength and health, and particularly the *dentes sapientiæ*, which will sometimes penetrate the gums much sooner, and prove of larger size and possessed of greater firmness than usual; a fact to be more particularly treated of hereafter, in that part of the article on caries, which relates to the causes of that disease in its simple state.

I must here, particularly observe, that to obtain these desirable effects, it will be absolutely necessary that all the four molares should be extracted, and, if possible, at the same time, or at least with very short intervals interposed.

The partial removal of these teeth will, in most instances, not only be entirely useless, but even become the actual cause of such irregularities as are sometimes totally incurable at a later period of life.

If, for instance, the molar tooth be extracted on one side, and not on the other, all the remaining teeth will, during their growth, bear an inclination to the side from which it has been removed; and if one or both of these teeth be extracted from the upper, and not from the under jaw, considerable disproportion between the two jaws will be produced.

I have very often observed, that the deformity, which consists in the shutting of the under incisors and cuspidati over the upper teeth, has been produced by the injudicious extraction of some of the teeth of the upper jaw, with a view to restore irregularities of comparatively very little importance, without taking proper care to secure a due proportion between the upper and the under jaws.

Indeed, these permanent first grinders, the formation of which commences soon after birth, and which generally make their appearance at the age of six or seven years, are usually found more affected with caries when they first appear than any other teeth;

and if, in a delicate subject, even but one or two of them should be visibly diseased, some original defect may generally be suspected to exist in the others; and hence, the best treatment is the removal of all the four as soon as possible, in order to preserve the perfect health, as well as the regularity and beauty of the other teeth.

When proper attention has been paid, in the manner stated, to the shedding of the teeth; when the diseases of the permanent teeth have been properly treated; when a sufficient regularity or suitableness of situation has been obtained, in order to afford facility for the requisite operative treatment of such diseases as must unavoidably arise from the original defects now supposed, generally, indeed, existing, but which may become visible at a latter period in any of the remaining permanent teeth; and, lastly when such caries is judiciously treated as soon as it appears, and followed by a constant application of a proper preventive treatment; a certain and permanent health of the parts is the natural and agreeable consequence.

I might adduce here a great number of cases which have proved to me, in the most positive manner, the efficacy of a judicious early treatment of children. Such cases, however, might seem less satisfactory to the general reader than many of those which are dispersed through this book; which, with the following one in particular, form, as it were, negative illustrations of the above principles, but, at the same time, a complete proof of the pernicious effects of the neglect of early attention to the shedding of the teeth, as well as of the fact stated regarding the wisdom teeth.

CASE XIX.

Miss C. from Newcastle, Delaware, a young lady about seventeen years of age, consulted me respecting her teeth, which were in the most deplorable state.

Almost every tooth in her mouth was in a diseased or putrifying state. Her gums were much swelled, and the lining membranes of many of her teeth were exposed, and had often produced the most excruciating tooth-ache. The patient had been rather a delicate child, but her general constitution seemed now very strong and good; yet the constant efforts of nature to rid herself of these troublesome and obnoxious parts had frequently terminated in inflammation of the gums and other parts of the mouth, which sometimes affected her whole system, and confined her to her chamber, and even to her bed.

The four second large grinders and eight bicuspidati, or small grinders, had either lost their vitality by the total destruction of either their lining membrane or their crowns, so that the roots only

were left, or the membrane was in a state of chronic inflammation or suppuration. The extraction of these teeth and roots was the only remedy of their morbid effect upon the other teeth, and alveolar processes, and the most important means of subduing the diseases of the teeth and gums primarily affected, and of restoring a general healthy action to the mouth, and especially to those teeth which were intended to be preserved by local operations.

1816, August 17th. Fifteen dead and diseased teeth and roots were removed in about twenty minutes. The bleeding was encouraged by washing the mouth for two days with warm water or sage tea.

August 19th. A portion of the alveolar process and gums, whence a tooth had been removed with great difficulty, was slightly inflamed and sore. The patient was therefore directed to use a warm lotion, with some tincture of myrrh.

August 21st. The whole mouth became quite free from pain and tenderness. The lotion was directed to be continued.

August 27th. The tartar of the remaining teeth was very cautiously and perfectly removed, and the lady, having been previously provided with the necessary directions and materials for keeping them perfectly clean, left Philadelphia, with the intention of returning at some future period for the completion of the treatment. The teeth to be preserved were the twelve front teeth, viz: the upper and under incisors and cuspidati, and the upper and under first molares; all of which were more or less diseased.

October 16th. The lady returned, and the first large grinder of the left side of the upper jaw was relieved from the caries in three places by filing, and in two places by extirpation: after which the cavities were stopped with gold. The opposite first large grinder in the upper jaw was restored by cutting away the caries in one place with the file and other cutting instruments, and in four other places by extirpation. In one place the nerve and lining membrane were unavoidably laid bare and wounded. It was treated accordingly, in the manner I have recommended, and all the four cavities were plugged with gold.

October 18th. The first large grinder of the under jaw on the left side was filed in one place, and in three others the caries was cut out, and the cavities were plugged with gold. One of these pluggings was on the posterior side. The first large grinder in the under jaw opposite to the above, was also filed in two places, and one diseased cavity, after suitable preparation, was plugged with gold.

October 21st. The right under cuspidatus being carious on the sides in contact with the next teeth, was made sound by filing on the posterior side, and a small division was made between the cuspidatus and the lateral incisor; after which, the caries being

extirpated from the cuspidatus, the disease was discovered to have already penetrated the cavity of the tooth, by which the lining membrane was unavoidably exposed: the nerve was treated accordingly, and the cavity stopped with gold. The opposite under cuspidatus was filed and stopped with gold on the posterior side; and the upper edges of the under cuspidati and incisors were all filed smooth to prevent their unnecessarily wearing away by mastication, and to diminish the friction of them upon the upper teeth as far as possible.

November 5th. The two upper cuspidati being diseased on the sides opposite to the neighbouring teeth, the lateral incisors being also carious, the disease was removed from the posterior parts of the right cuspidatus with the file, and a division was made between the tooth and the lateral incisor, by which the latter was freed from caries, and sufficient room was given to permit the extirpation of the diseased parts of the cavity in the cuspidatus. This being effected, the cavity was stopped with gold. The opposite left cuspidatus was restored, by cutting and filing away the caries on the two sides opposite to the other teeth; and, in order to remove the caries from the cavity of the left lateral incisor, a sufficient division was also filed, and the caries being thereby removed, the cavity of the lateral incisor was stopped with gold.

November 9th. The four cutting teeth of the upper jaw being all more or less diseased on the sides mutually opposite to each other, a division was made between those teeth, and a space was thus obtained to plug them as usual. The two central cutting teeth were plugged on both sides, after a smooth surface had been made by the file, and the left lateral incisor, which had been previously stopped with gold, was rendered perfectly sound on the opposite side by filing away the carious parts, and the right lateral incisor by extirpating the disease and stopping the cavity with gold.

In the left of the two central teeth, and in the right lateral incisor, the caries having proceeded to a great depth, the exposure of the nerve could not be avoided. It was treated accordingly.

The cavities of the upper front teeth were filed in such a manner, namely, from the inside of the mouth, that the stoppings could not be seen in front.

The patient being properly provided with the necessary means, was now directed to keep the teeth perfectly clean, and to wet the surrounding gums of those teeth, of which the lining membrane had been exposed, with a lock of cotton dipped in the tincture of myrrh, if any pain should be experienced in them; and she returned home with her teeth and other parts of her mouth perfectly restored to health.

December 14th. The lady having felt considerable pain for two days in the left upper central incisor, of which the lining membrane had been exposed, in consequence of a cold or of some other general cause of irritation, returned once more to Philadelphia. Slight pulsation and a heavy pain were felt in the tooth affected, and the gums were a little red. The latter were scarified to give some immediate relief, and the patient was directed to have one or two leeches applied above the affected tooth, as near to it as possible, and to be left to fall off of their own accord. She was also directed to encourage the bleeding by washing the parts for the first six hours with warm water, and afterwards to wet the gums with a lock of cotton dipped in a mixture of equal parts of tincture of myrrh and hot vinegar. By this simple treatment, the inflammation of the lining membrane was removed, and the patient was completely restored to health. I have frequently seen this young lady since that time, and have always been much gratified to observe the excellent effect of the treatment she had received, not only with regard to the health of her teeth, but also to her constitution generally, and to find that not only her physical strength and vigour had been generally benefitted, but also that her mind and spirits were much improved.

The last time I saw her, in 1822, she had cut all her wisdom teeth, which were in a remarkably sound and healthy state, and nearly twice the usual size in consequence of the healthy action existing in the parts, the plentiful nutriment which they thereby derived, and the free space which they had to grow in.

Although generally least calculated to promote the interest or celebrity of the dentist, or to procure a just consideration of his very important services; yet never will his attendance be an object of more solicitude, and no circumstances can afford a better opportunity for displaying his judgment and humanity, than in the treatment of the teeth of children.

At no age of the subject, can a successful treatment be more gratifying to the feelings of the humane surgeon; for it is at this time that he may lay the foundation of future comfort and health, and prevent many of the most afflicting and distressing idiopathic and symptomatic diseases, not only of the teeth and their contiguous parts, but also of the general system during the whole of the patient's life.

It is, moreover, at this time, that an injudicious treatment is especially dangerous and destructive, and the unhappy patient is much to be pitied, should he fall into the rude and murderous hands of those, who are equally a disgrace to the profession, the name of which only they can abuse, and to the judgment of individuals, who are induced to place confidence in their false pretensions.

Too much cannot be said to warn parents and guardians against entrusting their children into such hands. Could they see even a small part of the havoc which I am continually witnessing, they would lose no time, nor spare any expense to prevent such calamities. In illustration of the remarks I beg to refer to case 14, and to relate here an instance of a most lamentable mismanagement which occurred under my own observation

CASE XX.

In 1816, I was consulted by a lady who kept a boarding school, which was attended by the daughters of the first families from all parts of the country.

It would be quite impossible for me to describe my feelings on examining the teeth of these young ladies. From twenty to thirty of them had been under the care of a man who, without the talent and information necessary to qualify him for the humblest department of the profession, had presumed to practise as a dentist. In almost every instance where he had treated the teeth of these young ladies, I found them in the most pitiable state. Like those of all pretenders, his measures had been of the most injurious kind. Almost every operation had been attempted, but always injudiciously. Sound teeth had been filed, or unnecessarily separated at an improper time, and in so bad a manner as to render them almost too tender to bear the touch of the brush in cleaning them. Some had been greatly irritated by various improper attempts to cure their diseases; which were therefore much aggravated, and rendered far more troublesome than before. The diseases of the gums, alveoli, periosteum, and other parts of the mouth, had also been in every subject exceedingly aggravated by improper treatment; and in no one case had any thing been done which could possibly restore health to any of those parts.

These young ladies, as I have before said, were the daughters of the first families, from all parts of the United States of America, and had been sent from their parents and friends, to receive the benefit of the best moral and physical education which the country could afford. But, alas! with what results? Some of them were about to return to their distant homes, where they would be left to the pains, sufferings and diseases which had been inflicted upon them, without being able to receive any proper attendance for their teeth. Those who remained at school were placed under my care; and it was not without great anxiety on my part, and suffering and loss of teeth on theirs, that I was able to restore them to health.

I do not mean to attribute any part of the misfortune to the lady at the head of this establishment, otherwise than placing too precipitate a confidence in an impostor: for this reason, and be-

cause I do not wish to wound her feelings, or to injure the reputation of her school, I refrain from mentioning her name, and that of her residence. The hope of producing benefit, not injury, has induced me to record this remarkable narrative.

PRINCIPLES OF DENTAL SURGERY.

PART II.

COMPRISING THE HISTORY AND TREATMENT OF THE MOST COMMON DISEASES OF THE TEETH AND GUMS; AND THE METHODS OF PERFORMING SOME OF THE MOST IMPORTANT OPERATIONS IN DENTAL SURGERY.

CHAPTER I.

OF CARIES OF THE TEETH.

General Remarks on Caries of the Teeth.

CARIES is the most afflicting and destructive disease to which the teeth are liable; it not unfrequently spreads its ravages through the whole set, until every tooth is destroyed.

I believe I may justly assert that this malady has hitherto not been properly understood, nor satisfactorily described by any surgical writer.

One great cause of the confusion and contradiction pre-eminently discoverable in every essay, treating either theoretically or practically on this fatal malady of the teeth, is the surprising manner in which the disease itself has been confounded with its effects, viz. putrefaction; or the living tooth under the influence of the disease, with the dead tooth which has been destroyed by it: an error, by which authors have been led away from the subject, in their inquiries and observations, and have been induced to adopt and to advance theories and practices, false and unnatural in their facts and principles, as well as dangerous and destructive in their application.

Caries of the teeth must be considered as similar to gangrene of other parts of the system. And where we speak of caries as a disease, we mean that diseased action in the bony structure of the living tooth, produced by the chemical irritation of its rotten or dead parts.

Hence it is indispensable that we should make a due distinction between caries considered as a disease in the tooth, and the effect of that disease; viz. mortification and putrefaction of its whole structure.

Although the term caries is most commonly applied to dead, as well as to diseased teeth, this denomination, when applied to the former, is erroneous; for a carious tooth, properly so called, is a living tooth possessed of that vital action by which the morbid irritation of the dead substance is counteracted. By this counteraction more or less inflammation is produced in the bony structure of the tooth; whereas, a tooth, when deprived of this vital action, is no longer carious, but dead.

This distinction is of the greatest importance, not only inasmuch as the effects of diseased and dead teeth are very different, but also as they almost invariably require an opposite surgical consideration and treatment.

In consequence of a disregard of this difference, almost every writer, in treating of the diseases of the teeth, especially of that now under our consideration, has been led astray, and not only has entertained the most erroneous notions, but has asserted the most palpable contradictions, whereby the subject has been rendered exceedingly confused, and even unintelligible.

Even Mr. John Hunter, so celebrated for his superior judgment in other matters, has, perhaps, never given an essay to the world more remarkable for its prejudices and errors, than that on the teeth; especially where he treats on the disease, entitled, "The decay of the teeth, arising from rottenness, as well as on its symptoms and surgical treatment."

This work, though not without merits, as far as it regards the anatomy and natural history of the teeth, exhibits very pernicious theories, and such as have led to the adoption of the most mischievous malpractices in the treatment, which, indeed, prevail at the present day.

These dangerous and injurious theories adopted by him, of which the assertion, *that the teeth are extraneous and not organized bodies of the system*, was perhaps the most pernicious, arose from his unfortunate partiality for the operation of *transplanting teeth*, not only from the *living*, but also from the *dead* subject: a practice never followed by any beneficial result, and generally with the most injurious consequences to the general health of the individual; instances of which are well known to have occurred, not only during his life, but are also to be met with at this present time.

This treatment, indeed, has been the means of not only leading to other equally pernicious practices, but also of enabling the quack to delude the ignorant by his pretensions to extraordinary skill, to the great loss of both their health and their money.

Cases of the most daring and injurious nature of this kind, I witnessed in Philadelphia about five or six years ago, where a dentist had pursued this criminal practice to such an extent as to become amenable to law of the country, for the injuries which a child had sustained from his violent treatment, though previously to that period, ladies and gentlemen of the first rank had become the dupes of his empiricism.

In the first paragraph of his Natural History of the Human Teeth, p. 1, Mr. Hunter makes an assertion which is so contradictory to common sense and experience as not to require refutation. "The most common disease to which the teeth are exposed," says he, "is such a decay as would appear to deserve the name of mortification; but there is something more, for the simple death of the part would produce but little effect, as we find that teeth are not subject to putrefaction after death." And in another part, he confounds the effect of the disease, viz. putrefaction of the dead tooth, with the disease itself, or that which he calls the caries in the fang of the tooth; thus confounding the indispensable distinction between the diseased living and the perfectly dead tooth.

In another part, observing that the decay much less affects the fang or root than the body of the tooth, he states that the roots sometimes appear *quite sound* for some time after the body of the tooth is almost totally destroyed; the reason of this appearance is so obvious, that we can attribute this assertion of that sagacious author only to his being blinded by the most inveterate prejudices. The body of the tooth is really destroyed by the disease, and the remaining roots, which are always dead after the destruction of the lining membrane and the crown of the tooth, are disorganized only by chemical action in this dead state.

Caries in fact, is that state of the tooth, in which mortification has taken place in one part, and inflammation in the part contiguous to it, the former originally produced by the latter, and the latter kept up by continual contact with the former.

This rapid process of diseased action must consequently more quickly destroy the living tooth than the chemical agency, by which dead matter acts upon a bone of so hard and dense a structure as a human tooth; and the less, therefore, it is enabled by its very dense construction to arrest or suspend diseased action when living, it is naturally the more adapted to bear the most powerful chemical and mechanical influences, such as putrefaction, mortification, &c. in its dead state.

This may be frequently observed in dead roots, which remain after the crumbling away of their crowns; the roots being sometimes particularly protected by the surrounding parts.

The practices and remedies recommended by Mr. Hunter for the preservation, or rather, the *sudden destruction of teeth* affected by this disease, must be allowed to be not only extremely hazardous and injurious, but more or less certainly dangerous and destructive, and, indeed, in opposition to all good surgical principles.

Such, for example, are those of *transplanting teeth in the manner stated; extracting a tooth, boiling it in water, and replacing it in its natural socket; destroying the nerve or lining membrane of a tooth, either by concentrated acids, or the actual cautery; burning the ear; blistering and bleeding the adjoining parts, and of exhibiting stimulating medicines; such as, spirits of lavender applied to the nose, &c.*

All these measures, some of which are either a thousand years old, and recommended, or originally produced by Mr. Hunter, are adduced with the erroneous belief that they may tend to preserve such teeth as have either lost their vitality, or are actually struggling with death; an object which will never be obtained, either by these or by any other remedies that the most ingenious abuse of science can invent; but allowing that it were possible to accomplish that object, such preservation would be in most instances not only of little benefit and hardly desirable, but almost invariably injurious; for dead teeth and roots, without taking into consideration the injury and disgusting effect arising from them to the breath, are always a cause of disease to the living teeth and disorder to the general health.

These remedies, however, are of equal value with the theories and scientific views advanced by their propounders, on the subject of the diseases of the teeth, and had they been the production of a man of less eminence than John Hunter, they would most probably, and very justly, have been considered the greatest absurdities, as, indeed, his meddling with the operative part of this peculiar branch of surgery, without sufficient practical experience, might be very justly censured, as liable to the application of the old adage, "*Ne sutor ultra crepidam.*"

Mr. Fox, although differing in many instances from Mr. Hunter in his treatment of caries, coincides with him in his erroneous notion, where he disregards the necessary distinction between caries and total death, or, between carious teeth and dead teeth. He says, "The progress of caries seems to be retarded when it has destroyed the whole crown of a tooth, for, although the decay may have gone on in the body of the tooth with great rapidity, yet the fangs will often remain for many years with scarcely any alteration, and they often continue for a considerable length of time firmly attached to the socket, without occasioning any inconvenience." See Fox's Nat. Hist. and Diseases of the Human Teeth, part ii. page 10.

His general views of this disease are but little more satisfactory than those of Mr. Hunter, although perhaps more than those of any other writer; and his idea of the causes of the malady, though founded evidently on further research than that of any other author, still leaves much unaccounted for: but his surgical treatment of the disease in its different stages, is particularly vague and limited, and proves, as well as the rest, that he was a far better dental anatomist and physiologist than pathologist and surgeon.

Some of his practices are of the most empirical nature, and not less cruel and dangerous than opposite to all good surgical principles and sound judgment.

His experiments to preserve a tooth, or rather to destroy its *vitality*, by *luxation* or by *partial extraction and replacement of it in its socket*, as well as the manner in which he recommends the operation, clearly prove how little he was acquainted with the true pathology of the teeth, and that of the irrelative parts. See Fox's Nat. Hist. and Dis. &c. part xi. p. 40.

But his treatment of the incisors of the upper jaw is not less daring and objectionable than the operation of transplanting teeth, as recommended by Mr. Hunter, and is far less excusable in him, who was a practical dentist, than in Mr. Hunter, who was only a theorist.

In the operation above alluded to, Mr. Fox recommends *the extraction of the incisors, and after being stopped with gold, their replacement in their sockets*, and he had the confidence to assert that he had been successful in the practice of this operation, in which experience convinces me that he must have been deceived. See Fox's Nat. Hist. and Dis. &c. part ii. p. 41.

His proposed treatment of the diseased lining membrane of the tooth, when in a state of suppuration and almost total mortification: viz. that of *drilling a hole in the tooth in order to furnish an outlet for the matter to escape*, is also injudicious and contrary to all good surgical principles, and not only very painful to the patient, but quite unavailing for its object, inasmuch as the death of the tooth will inevitably take place. See Fox's Nat. Hist. and Dis. of the Teeth, part ii. p. 12.

These positively unsuccessful and painful operations, calculated only for the temporary mechanical preservation of a tooth, are deserving of the greatest reprobation, because when a tooth loses its life, or when the preservation of its vitality has become out of the reach of art, it is not only a lost tooth, but also a great cause of disease, and should not, except under very particular circumstances, be left in the mouth. Such views of the dentist certainly furnish the most palpable proofs of a total unacquaintance with the true pathology of the parts.

It is unnecessary to make references to any other writers on this subject ; all of whom, as far as I am acquainted with them, have, indeed, by reason of their researches having been either too superficial or too hypothetical, little improved the knowledge or treatment of this formidable disease.

When we consider the great variety, as to appearances, violence, situation, &c. of this disease, it might admit of being distributed into a considerable number of classes, and, by such an attempt, I might perhaps make myself deserving of the honour of equalling in technicality the most learned French dental writer, even M. Duval not excepted ; who has most ingeniously described seven different varieties of caries, which I beg permission to enumerate, with no other view, however, than to gratify the curious reader ; they are, first, caries calcarea ; second, caries corticana ; third, caries perforans ; fourth, caries carbonaria ; fifth, caries stationaria ; sixth, caries curata ; seventh, caries derumpens.

I certainly consider such classifications to be entirely useless and ridiculous, as they are apt to produce learned obscurity, which would only vitiate the intention of this essay, of which the object will, I trust, be found quite opposite to that of the too learned gentleman just mentioned.

My object is practical utility, and to be as intelligible as possible ; I hope, therefore, that the reader will be satisfied with plain and simple, but comprehensive facts, accurately detailed, without the ambition of being thought either elegant, learned, or marvellous.

Having, in the foregoing pages, said as much as I deem necessary to guard against old prejudices and inveterate habits, I shall now give a short description of this disease, and state such pathological and practical views as I consider to be founded on observation, and to have been proved by a certainly successful treatment in my own practice.

Although I have expressed my great disapprobation of too extensive and pedantic classifications, yet I should be guilty of a similar fault in the other extreme, if I were not to point out certain distinctions in the several stages and methods of treatment of this disease. I therefore deem it necessary to divide the subject into three parts, viz. first, the treatment of simple caries or of the disease so long as it exclusively affects the bony structure of the teeth. Second, the treatment of complicated caries, or caries accompanied by disease of the lining membranes of the teeth ; and third, the treatment of the morbid effects produced by teeth and roots of teeth deprived of their vitality.

Of Simple Caries, or Caries of the Teeth affecting their bony structure exclusively.

Caries in my opinion is in a certain sense a contagious disease ; for this disease in one tooth will generally communicate itself to the next, not only by its being in immediate contact with the surface of the adjoining tooth, but also, probably, indirectly by its chemical influence.

The combined action of many carious teeth invariably communicates disease to other teeth of the set, though perfectly exempt, previously, from all apparent tendency to caries.

This fact is constantly proved to me by experience, and may be made evident to the least attentive observer.

Though this disease attacks all the teeth without distinction, yet it may be considered as a general rule, accordant with my experience, that the molares or grinding teeth more frequently suffer from this malady than the incisors and cuspidati ; and that the bicuspidates or small grinders, incisors and cuspidati of the upper, are, generally, much more subject to caries than the same teeth of the under jaw.

The large grinders are affected with this disease most commonly on their grinding surfaces ; whereas the small grinders and front teeth generally suffer from it on those sides which are in contact with the adjoining teeth.

It is not an uncommon occurrence to find a single tooth affected with caries in several distinct places, sometimes amounting to five or seven, of more or less extent.

This malady originates either in the enamel or external surface, or in the internal parts of the bony structure of the tooth. It may, therefore, be properly divided into two kinds, viz. external and internal caries.

Of External, or Superficial Caries.

External caries differs considerably from internal caries, particularly in its origin and remote causes. Each will, therefore, require a separate consideration.

Although external caries may be slower in its progress than the other, it is not less certain of producing ultimate destruction, and I am inclined to consider it of more frequent occurrence than internal caries, and consequently a source of at least as serious apprehension.

All the teeth are quite as liable to this variety of caries as they are to the other ; but this not only extends its morbid action, like the former, to the crown, but also to the neck and roots of the teeth, whenever exposed to the ordinary causes of the disease.

Although all parts of the crown and of the body of the teeth are liable to this disease, yet it is most frequently observed to commence at those sides which are in contact with the neighbouring teeth.

It never affects the extreme ends of the roots, but is most frequently seen in them near the neck; and it generally attacks both the roots and the neck on those sides of the tooth which form the semi-circle or arch of the jaw.

When it makes its first appearance on the surface of any part of the crown of the tooth which is covered with enamel, it generally presents itself as a very small speck; though sometimes as a large, round, or irregular spot.

After the removal of this irregular, broad, or round spot of caries with the file, it will be generally observed to have extended superficially only: and to have penetrated in this manner through a part or the whole of the enamel.

It will next exhibit on the surface of the bony structure a small spot, similar to that sometimes observed on the enamel; whence, in either case, it almost invariably proceeds in a direct line towards the cavity of the tooth.

This spot appears in some cases not larger than a point, although it already may have penetrated a third, or even half of the bony structure of the affected side of the tooth.

On such parts as are not covered with enamel, the neck and roots of the tooth for instance, the spot generally appears irregular, and extending across a considerable portion of the surface of the neck, having the appearance of a notch of an oblong form.

The colour of carious spots may be white, grey, yellow, brown, or black; the specific appearance being presumed to depend upon the chemical influence of the external fluids on the diseased parts.

Sometimes the disease of the crown penetrates very nearly to the lining membrane of the tooth, before the mortified bony structure becomes sufficiently soft to allow the escape of the diseased matter, so as to form a cavity; but this is more rarely the case in the roots or neck, which are generally of a softer and more easily corroded nature.

This state greatly depends upon the different proportion of the animal and earthy constituents of the bony structure of the tooth; and also on the chemical state of the saliva, which is naturally much influenced by the state of the other teeth and parts of the mouth, as well as by the general state of health of the individual.

As the carious matter increases in its corrosive qualities, and the affected part becomes softer, the disease causes a cavity in the crown of the tooth similar to that produced by internal caries; excepting that the cavity produced by the latter is generally large and round, whilst that produced by superficial caries is frequently narrow like a tube.

When seated in the necks and roots of the teeth, caries rarely forms such a cavity; but extends itself on the surface, and becomes broad and more irregular in its progress; and sometimes in the neck of the tooth it has the appearance of undermining the enamel towards the crown, so as to form an oval or oblong cavity ending in a point at each extremity, such as might be cut into it artificially by a triangular file.

After the disease has penetrated through the enamel, its progress and effects, as well as symptoms, are precisely like those of deep seated caries.

It is subject to all the same general and local influences, with this difference however, that such teeth as are affected by external caries being of a stronger original construction than such as are affected with deep-seated caries, they are acted upon more slowly than the latter; consequently if we suppose that the diseased action of deep-seated caries requires from one to five years to penetrate through the bony structure of the tooth, and to destroy the life of its lining membrane, superficial caries may require from four to ten years: and the chemical destruction of a tooth, the death of which has been effected by the latter disease, will occupy a much longer time than that of the former.

This kind of caries sometimes advances so slowly in an originally strong tooth and extends itself so little on the surface, that its progress may appear to be altogether arrested.

Entire suspension of the malady, however, is impossible, as long as dead matter is allowed to remain in contact with the living structure; although it may proceed so very slowly as to make its progress imperceptible for some time, it will, however, in the event, never fail to become evident on the accession of symptomatic inflammation, or of any other sufficient cause of irritation.

Of internal or deep-seated Caries.

Internal caries generally affects the parts between the enamel and lining membrane, but somewhat nearer to the former part of the tooth, on the surface of which it is first observed from its giving the tooth a bluish hue.

It becomes more evident by presenting the appearance of a blue mark, and afterwards a brown spot, till it shall have penetrated through the whole external bony structure and enamel, and become a cavity, either on the grinding, or on one of the lateral surfaces.

The orifice of this cavity is at first very narrow; but it increases in time externally, in the same proportion as the caries extends itself in the cavity.

This disease, as far as my experience has enabled me to judge, always attacks the crown of the tooth, and never the neck or the root.

As the disease is more actively resisted by the greater vascularity, and consequent activity of the internal bony structure than by the harder and less vital external parts of the tooth, it never proceeds so far towards the cavity containing the nerve, as to render this membrane altogether unprotected by the bony structure, before it has penetrated through the external osseous parts, including the enamel, and has thus formed a natural outlet for the bony abscess.

Mr. Fox and other writers assert, that they have seen caries sometimes produce idiopathic inflammation in the lining membrane, and the death of the tooth, before the disease has penetrated through the external surface of the crown; but I am perfectly assured of the contrary, because it is in opposition to the principles of that chemical action to which the tooth is exposed, when affected by this disease, and against all accurate observation and experience. See Fox's Nat Hist. &c. part ii. page 14.

The cases which have given rise to this opinion, have not been considered with sufficient accuracy; this has arisen, either from the difficulty of discovering the carious cavity, or from erroneously attributing the death of the tooth to the effect of caries, when it has been produced, perhaps, by some mechanical irritation, an accidental blow, clumsy operation, or great irregularity in the situation of a tooth, &c.; in consequence of which an inflammation and mortification of the lining membrane has taken place before its extraction.

I have already explained the great difference in the effect produced by the chemical influence of dead or carious matter upon the living bony structure, and that upon a tooth already destitute of life; a fact, however, totally disregarded, and therefore productive of the most injurious malpractices, in the treatment of this disease.

Putrefaction acting upon a dead tooth, destroys the bone by immediate chemical action, and produces a direct change from a state of mortification to that of putrefaction. It, therefore, naturally finds the greatest resistance in the hardest and least vascular parts of the tooth.

But putrefaction in the form of caries of a living tooth, destroys the bony parts, with which it is placed in immediate contact, in an indirect manner, producing by its chemical irritation, in the first place, inflammation, and afterwards mortification. It is in this instance, therefore, much more actively resisted in its destructive influence by the vascular than by the hard parts of the tooth. Consequently, as the bony structure of the tooth is more vascular the nearer it is to the lining membrane, and harder and more compact the nearer it is to the enamel, and, therefore, endued, in proportion to its vascularity, with a greater or less

power of resisting inflammation; the diseased action of caries will proceed more rapidly towards the exterior, than towards the interior of a tooth, and invariably produce an outlet at some part of its surface, before it can come in contact with its lining membrane.

Although the enamel of the teeth, from its not being organized, is not subject to the immediate influence of inflammation; and although, from its crystalline nature, it is also most admirably calculated to resist putrefaction and other chemical influences; it is, nevertheless, from its peculiar structure, easily destroyed by mechanical causes, when once deprived of the support of its bony structure: consequently, where caries has destroyed that support, it is soon removed by mastication, and an external orifice to the carious cavity is thus produced.

When the disease has thus made itself an outlet through the bony structure and enamel, its progress towards the lining membrane is at this time somewhat retarded by the free evaporation of the putrid vapour, and the partial discharge and separation of the dead matter; it is, however, soon afterwards exasperated by other exciting causes, viz: the additional external chemical and mechanical influences.

The caries now proceeds towards the cavity, more or less speedily, according to the constitutional strength of the tooth, and violence of the general and local causes; until, at last, the disease penetrates through the whole bony structure, and produces considerable irritation upon the lining membrane, so as to involve that important and exquisitely sensible structure in idiopathic inflammation. At this period the disease may properly be called complicated caries.

The degree of rapidity of the destructive progress of deep-seated caries, depends upon the constitutional strength of the affected tooth, and on the degree of violence of the general and local exciting causes, which act simultaneously in aggravating the disease.

Internal caries, however, proceeds much more rapidly than external; and it may be said to require, generally, from one to five years from the commencement of its corroding process to penetrate through the whole bony structure, and from three to twenty-four months afterwards before the destruction of the vitality of the lining membrane of the tooth is totally effected: putrefaction and absorption, however, may still require from seven to fifteen years to complete the entire destruction and removal of the dead parts.

Simple caries, in each of its forms, differs in its effect on the temporary teeth, from that on the permanent set, only in proportion to their less dense and less durable construction, and requires no separate consideration, except in the surgical treatment.

Of the Symptoms of Simple Caries.

The symptoms produced by simple caries, whether external or internal, depend upon the stage of the disease, and on the local and general causes by which the disease is disturbed and aggravated.

Caries in its first stages produces hardly any pain or inconvenience; it is generally in the latter period only of its progress, when it has penetrated almost the whole side of a tooth, and nearly reached its nerve, that the bony parts of the tooth become tender, and productive of some slight uneasiness.

The inconvenience, however, is so trifling that it is disregarded, unless when exasperated by some cause of general or local irritation, which might produce symptomatic inflammation in the bony structure, through the medium of the lining membrane of the tooth. This state of more than ordinary irritation, however, always subsides after the removal of the temporary irritating cause.

Even at the time when the disease has penetrated the whole bony structure, and has exposed the nerve to many additional general and local causes of irritation, this delicate membrane may sometimes remain in that state for a considerable time without producing any great inconvenience.

These symptoms, however, are often much aggravated by certain general or local causes; such as, general diseases, especially inflammatory fevers of any kind, sudden and frequent changes of temperature from extreme heat to extreme cold, abuses in the application of active internal and external medicines, such as mercury, opium, acids, improper tooth powders, and tinctures, &c. as well as dental operations, such as filing, cutting, and stopping the teeth, &c. when performed in the injudicious manner in which these operations usually are performed at the present time, and especially as they were recommended to be performed by Hunter and Fox.

In consequence of such irritation, the inflammation of the bony structure of a tooth, affected by caries, is much increased, whilst inflammation in the periosteum is also thus frequently produced; in consequence of which, the teeth are rendered very sensitive, and even sometimes painful, though the disease may not yet have penetrated to the cavity of the tooth.

Of the Causes of Simple Caries.

The predisposing cause of external caries is sometimes an original malformation of the enamel, occasioned by some physical cause acting upon the external surfaces of the teeth during their formation and before their protrusion through the gums; but it frequently happens that this cause is found to operate in combina-

tion with various external influences, both chemical and mechanical, after the teeth have arrived at their maturity, when they become predisposed to superficial caries, as these morbid influences are at that time competent to act more directly and powerfully upon the teeth, so as to injure their enamel, and, in the course of time, to expose the gums, the alveolar processes, and consequently, the neck and roots of the tooth to certain destruction.

The local causes are diseases of the gums, the alveoli, periosteum and maxillary bones, as also dead roots and teeth, caries in the other teeth, tartar, injudiciously performed operations, bad artificial teeth, &c.

The original cause of internal caries is generally some malformation of the bony structure of the teeth themselves, occasioned generally by some constitutional disorder at an early period of their formation, and sometimes, though very rarely, after their protrusion through the gums.

The proximate cause of internal caries is inflammation of some internal part of the tooth predisposed to the disease; and in external caries, a similar affection of some external part of the tooth: both of which end in mortification.

The dead or mortified bony matter thus produced by inflammation, forms the most immediate exciting cause in all the subsequent stages of the disease.

All general morbid influences act as predisposing causes upon the sound teeth, and as exciting causes upon the teeth already affected with either deep-seated or superficial caries when it has arrived at a certain extent; and all the morbid local causes act as predisposing causes of superficial caries, and as exciting causes of both the superficial and deep-seated caries, when the latter has penetrated through the external surface of the tooth; hence, caries, the proximate cause of disease in one tooth, forms a predisponent cause of disease in another, and also an exciting cause of the disease in a whole set of teeth.

Caries, also, in all its different stages, forms a more or less extensive predisposing as well as exciting cause of the diseases of the gums, periosteum, alveoli, and maxillary bones.

Hence it very naturally follows, that the number of maladies will increase in the proportion of the increase of the morbid causes, and these causes in proportion to the extent of diseases actually existing; and that the increase of both is more rapid in proportion to the extent and importance respectively.

The truth of these statements has been proved to me by anatomical and pathological observations, which I have frequently made during my practice; and may be ascertained by every surgeon-dentist who will take the trouble to institute similar observations and experiments.

It is a certain fact, though perhaps not generally known, that both external and internal caries are frequent affections of some teeth, a long time before they have completed their passage through the gums.

This mostly occurs in the molares of the permanent set.

In almost every instance where the gums and temporary teeth of a delicate child suffer from disease, it will be found that the first permanent large grinders suffer from deep-seated caries in different places, and have the appearance of some malformation or debility of their bony parts.

As these teeth commence their growth immediately after birth, and pass through the gums at the age of six or seven years, they are exposed to the same general and morbid influences as the temporary teeth, and are consequently affected in a similar manner.

During the age of from seven to fourteen years, considerable changes may take place in the young constitution, and tolerably good health may be supposed to be enjoyed by the individual.

By the early extraction of these teeth, and a judicious attention to the shedding of the others, I have observed that many diseases and disorders of the permanent set, and the other parts subservient to them, have been prevented, whilst, without the removal of them, a permanent cure of the other teeth has generally been impossible to be obtained.

It is also very common to observe, that the *dentes sapientiæ* suffer very much from caries, even at their first appearance, and that soon afterwards they are destroyed by this disease. It is from a superficial view of this fact that the common opinion has arisen, that the wisdom teeth appear the last, and are lost the first of all the teeth.

These teeth are not completed, as to their formation, until adult age. They never appear before the age of puberty, and seldom later than the thirtieth year. In common with the other teeth, they are exposed to the influence of all general and local causes capable of affecting the constitution during the period of their development. Hence, if the individual should be labouring under general ill health, these teeth will most frequently be found, on their appearance through the gums, diseased in different places, and affected with deep-seated caries, and, if their early growth was much influenced by many local diseases of the mouth, they would be found affected with superficial caries; and where both general and local causes had been acting on their health, both these diseases will be found to have seized upon these teeth.

In all those instances, however, in which a perfect cure of all the teeth and gums had been obtained, previously to the age of thirteen or fourteen years, or before the commencement of the

formation of the dentes sapientiæ, I have almost invariably found that these teeth have acquired a most excellent and durable health, even in very delicate subjects.

Moreover, I discovered that the dentes sapientiæ accommodated their shape in a remarkable manner to the place furnished for their reception; so that when the loss of the molares at an early age had given them sufficient room, and nourishment, they almost always availed themselves of this advantage, and became very large and perfect; whereas, when the whole set remained complete, these teeth have been generally very small and defective.

This fact suggested to me the idea, that by an early judicious treatment, not only health and strength might be afforded to these teeth by art, but also that they might be made to grow to a much larger size than usual.

The truth of this principle has been so satisfactorily proved to me by repeated experience, that I have become quite confident on the subject; and, when attending to the cases of young people between the ages of thirteen and seventeen, I have often promised them, that I would prepare so good a reception for their wisdom teeth, as almost to idemnify them for the loss of their molares, which I considered it necessary to extract; and in most instances I have not been disappointed in my expectations.

If, for instance, the second molares were in so diseased a state as to afford scarcely any hope of their permanent preservation, I have, by extracting them before the wisdom teeth have much advanced in their growth, and by restoring all the other teeth and parts in the neighbourhood to perfect health, so much assisted the formation of these teeth, that they have grown to almost double their usual size, and possessed an excellent bony structure. See case 19.

The same important object may, however, be also obtained by the early removal of the first large grinders, which are much more frequently found in a diseased state than the second, as has already been stated. The early extraction of these not only improves the healthy state of all the other teeth, and the contiguous parts of the mouth, but is followed also by the most beneficial effects in respect to the position and regularity of all the remaining parts, inasmuch as the second small and second large grinders will, in a great measure, occupy their places, and thus afford sufficient room for the anterior teeth as well as the dentes sapientiæ.

Of the Surgical Treatment of Simple Caries.

The only remedy of caries is, first, the entire removal of all general and local exciting causes, and afterwards the removal of the proximate cause, by the complete extirpation of the morti-

fied or inflamed parts of the bony structure of such teeth, by surgical operations properly adapted to the several stages of the disease.

When superficial caries has not penetrated more than one third of the bony structure, the only judicious treatment will be to cut away the dead and diseased part by means of the file and chissel, or any other suitable cutting instruments; so as to produce a sound and even surface.

When it has penetrated more than one third of the bony structure of the diseased side of the tooth, yet has not exposed, irritated, or inflamed the nerve of the tooth, the dead and inflamed parts of the bony structure are to be removed by extirpation, and the defective parts restored by stopping the cavity with gold.

Deep-seated caries can only be cured by the latter operation; and the filing alone is never to be attempted for the removal of this species of caries, as the disease, instead of being removed, will be increased by the irritation; indeed, a removal of the caries cannot be accomplished by this operation without exposing the lining membrane to too great indirect action of all the external irritating causes to which the teeth are liable: inasmuch as an imperfect removal of the carious matter would leave the tooth, not only under the same morbid influences to which it had been before exposed, but would deprive it of some of its protecting constituents, and increase its debility by so irritating an operation: the operation of filing or cutting, therefore, performed in either way, augments the disease and hastens its destructive progress towards the nerve of the tooth.

To insure success in the performance of these operations, they must be performed in conformity with the principles, and in the manner which I shall hereafter describe, and a relapse of the disease be prevented by the removal of all exciting causes, and a prevention of their recurrence.

The treatment of simple caries in the temporary teeth, is very different from that in the permanent set; for, as the utility of the former is of much shorter duration than that of the latter, such surgical treatment only should be adopted as may tend to retard the progress of the disease, to diminish its morbid influence as much as possible upon the other teeth, and to prevent its effect upon the permanent set.

For this purpose the necessity of the greatest cleanliness of the mouth cannot be too much impressed upon the mind of both parents and children; as well as the application of those remedies already more particularly stated in part i. ch. ix. of this work.

Of Complicated Caries, or Caries accompanied by disease in the lining membrane of the tooth.

When either external or internal caries has penetrated the bony structure as far as the natural cavity of the tooth, the lining membrane becomes inflamed and diseased.

In this state the disease may be properly called complicated caries, as the tooth is affected not only by the caries of the bony structure, but also by inflammation of the lining membrane.

Instead of being resisted in its progress by the healthy action of this membrane, the caries is now aggravated by its diseased state; and this caries by its greater extent, becomes a greater exciting cause of inflammation in the nerve.

The tooth, being thus subjected to the influence of these two distinct diseases, which are rapidly advancing to their final crisis, viz. suppuration of the internal membrane, now soon loses its vitality.

For a just understanding and a judicious treatment of complicated caries, this disease requires to be minutely observed during its progress in every stage, and its different causes and effects, as well as symptoms and appearances very perfectly understood.

In this state the disease differs somewhat in appearance from simple caries; the tooth so affected, has generally an opaque appearance all over the surface of the enamel. This, however, is not easily distinguished, except by the very experienced dentist.

When the disease in its first stage has penetrated into the interior, and destroyed the vitality of the bony structure, the osseous parts, although dead, retain their hard and dry state for a long time.

Although the lining membrane is then slightly irritated by the contagion of these dead parts, yet it is at the same time protected by them from several irritating causes; and although some increased action may be produced in this membrane, yet it remains sometimes apparently free from disease for a long period; and may be considered as only in a state of morbid predisposition.

In the second stage, when the disease has produced a greater extension of the carious cavity, and, consequently, the admission of a greater quantity of corroding matter, the dead bony parts in the neighbourhood of the nerve gradually become softer, and this membrane is more irritated, and rendered more liable to inflammation from the application of any chemical, mechanical, or other cause.

Still, in this state, the lining membrane may frequently recover from such inflammation, and resist the local irritation arising from the contact of the dead bony matter, exposure to the saliva, or atmospheric changes for a considerable time, if the disease is not aggravated by causes of extraordinary violence.

But when the disease has reached its third stage by the great violence and long continuance of the influence of the general and local causes, and the repeated return of the inflammation and supuration of the nerve, the disease is fast approaching its fatal termination, namely, the total destruction of the lining membrane and consequent loss of vitality of the tooth itself; the dead bony structure of which is then left to be destroyed either by chemical solution, putrefaction, or absorption.

The rapidity, therefore, of the transition from one stage to another, in complicated caries, depends greatly on the degree of violence of its causes, and its progress is not always so rapid as is generally supposed, for a period from three to twenty-four months is required by it, to destroy the vitality of the lining membrane and bony structure of the tooth, although this progress is much more rapid in the temporary, than in the permanent teeth, and may sometimes be greatly accelerated by accidental or artificial causes: such as, falls, blows, acids, caustics, the actual cautery, and surgical operations; all of which might be considered as likely to be no less violent in their future morbid effects, than they are rapid in destroying the vitality of the tooth.

CASE XXI.

In the case of a young gentleman of Philadelphia, the nerve of a tooth was found perfectly exposed, and, to judge from the appearance and from the history of the case, had been under the influence of this disease fifteen or eighteen months. I extracted the tooth, and have it now in my possession.

CASE XXII.

In another instance, the case of a medical friend of mine in Philadelphia, the nerves of three teeth had been exposed by the dentist in attempting to stop them, and the irritation produced by the pressure of the gold kept up a constant inflammation, with periodical pain of a slight nature, ever since the operation was performed, which was about fifteen months previously.

Upon the removal of the plugs, the lining membranes bled profusely, but after I had carefully extirpated all the carious matter, and treated the nerves in the manner to be stated hereafter, the parts were restored to perfect health, and continued so without any pain for two years afterwards, at which time I left Philadelphia.

Of the Symptoms of Complicated Caries.

The symptoms of complicated caries, like those of simple caries differ according to the state of the malady and the violence of the local and general causes by which the nerve of the tooth is irritated.

In its first stage, the disease seldom produces so much inflammation in the lining membrane as to render it very painful, and its effect is generally, no more than a slight irritation or hard pressure; or exposure to heat or cold, as real tooth-ache is very rarely found to result from the disease in this stage.

The symptoms of the second stage differ from those of the first only in the degree of their violence and frequency. The pressure of a blunt probe will produce more or less pain, and the slightest external or general irritation, arising, for instance, from heat or cold, or acids, indigestion, or a little more wine than usual, may bring on a violent fit of the tooth-ache; but when the inflammation in the lining membrane subsides, the tooth-ache generally ceases, and the tooth will be quite free from pain or uneasiness, until the inflammation is produced again by the same, or similar causes.

When the disease has arrived at its third and last stage, that is, when the whole lining membrane is inflamed and proceeding to suppuration, it is exquisitely painful, and the symptoms are then very violent, and sometimes very alarming.

Inflammation now increases in one, and suppuration follows in the other part of the nerve of the tooth, and the pain and morbid action are constantly excited, not only by the previous causes, but also by the suppurated matter of the diseased parts; which, as it cannot be discharged like that formed in other soft parts so as to afford relief, continues a constant cause of irritation and rapid destruction.

The disease, therefore, proceeds constantly changing from acute to chronic inflammation, and *vice versa*, accompanied by more or less pain in the whole affected tooth.

At this period, the teeth nearest to the diseased tooth, and sometimes those of one or both sides of the same jaw are symptomatically affected, and rendered almost as painful as the one primarily diseased.

The symptomatic inflammation frequently extends not only to the gums, periosteum, alveoli and maxillary bones, but also to parts more or less distant; such as the eyes, ears and throat, and sometimes the digestive organs, as well as the whole nervous system are symptomatically affected; the latter to such a degree as almost to produce madness, on which account the French have given the acute state of tooth-ache the appropriate term of "*une rage de dens*."

When the disease has continued to rage in this manner for some time, and the suppuration has carried off the principal part of the lining membrane, its power becomes partly exhausted, and it returns into the chronic state without interruption of the diseased action, and with little pain, until it has destroyed the prin-

cipal part of the lining membrane, and afterwards the small fibres which pass through the root. The tooth is then deprived of all its vital principles, and the death of the bony structure follows.

The symptoms, however, which have been just described, are not always present, and some teeth are also more subject to them than others.

The upper cutting teeth, for example, may be observed to be under the influence of simple and complicated caries in all their different stages, without being in the least painful, and the incisors and cuspidati of both jaws may be considered in general to be less subject to the above painful symptoms than the bicuspidati and the molares; and even in these last, these symptoms may also never appear, in consequence of the disease remaining in an uninterrupted chronic state. The pain may also be prevented by the sudden death of the lining membrane of the tooth, from some accidental or artificial cause, as have been mentioned before.

Hence it frequently happens that one or more teeth may lose their vitality by the ravages of complicated caries, without giving the individual any warning of their perilous state; whilst in other cases the most painful and alarming symptoms are experienced. Though this fact may seem very surprising, it may nevertheless, be well accounted for in every instance, by a particular inquiry into the nature of the disease.

If caries, for instance, is left entirely to its own course and natural influences, and not aggravated by local or general causes, its progress is generally regular and chronic.

During its progress through the bony structure, it produces by its ordinary chemical action, a constant change from chronic inflammation to mortification, until it comes in contact with the lining membrane, when the same regular diseased action produces that gradual chronic inflammation and almost imperceptible supuration, which gradually destroy the soft parts, without any particularly painful symptoms.

When, at a later period, many teeth are carious at the same time, and the other parts of the mouth are in a more or less diseased state, or when, by accident or injudicious treatment, many diseases are produced in the teeth and their relative parts, it also frequently happens that no tooth-ache is produced, although, perhaps one tooth is lost very soon after another, and thus, by the constant counter-irritation which is produced by one diseased part upon another, all are kept in a state of constant disease of a chronic kind; while at the same time the tender state of all parts of the mouth obliges the patient to be perpetually on his guard, to avoid accidental irritations, which might produce acute inflammation.

And even if it should happen that acute inflammation should arise from some temporary exciting cause, such as, fever, derange-

ment of the digestive organs, pregnancy, or suckling, cold, or other external irritation, it will frequently be of short duration, and both the inflammation and the pain will be confined either to one tooth only, or, as is most frequently the case, to the parts more or less related to the teeth; and the general state of the mouth will soon change to its chronic state again, and the tooth-ache or pain will cease.

In consequence of this long duration and slow progress of these chronic maladies, and the apparently small inconveniences produced by the diseased nerve, or lining membrane of the teeth, complicated caries is, frequently, altogether overlooked, the pain being considered as a symptom of general disease, or of some remote morbid cause; and the temporary exciting causes of the change from the chronic to the acute state of the disease, such as have been just mentioned, are frequently considered the original and proximate causes of the painful symptoms.

This mistaken notion frequently leads to an entire neglect, not only of the proper treatment, but also of the necessary regular attention to cleanliness.

The individual supposing the teeth to be secondarily affected only, under a constant apprehension of disturbing them too soon, puts off this attention until the tender state of his mouth shall have been cured by the removal of the mistaken cause. In consequence of this removal not being effected, the disease, together with the tenderness of the affected teeth is constantly increasing; much tartar is deposited; and a diseased state of the gums is produced by which the breath is rendered very offensive: effects, productive of no little inconvenience, and excitement of the diseased action in the parts affected, as well as of the general system.

This morbid state of the mouth, which would be most distressing were it to seize upon the patient suddenly, is, from its supposed insignificant origin and slow progress, sometimes supported by habit and even left altogether unobserved; and often, while the individual considers himself in a state of tolerable general and local health, he is under the influence of many disgusting diseases, which are not only destroying the teeth, but impairing the constitution; and which, in combination with any other unexpected general disease, are likely to become the means of a premature death.

Of Tooth-Ache.

Tooth-ache, or that painful symptom of acute inflammation in the lining membrane of the tooth, which is so happily denominated by the French, "*une rage de dens*," is, according to my observation, the result of a change in the affected parts from chronic to acute inflammation, occasioned by internal or external causes altogether foreign to the local disease.

It is invariably produced by some violent irritation acting upon the diseased nerve, and not the immediate effect of the disease itself. It may, therefore, be generally palliated or relieved by a removal of the causes, or the restoration of the parts to their chronic state, by the assistance of either art or nature.

Hence the tooth-ache is very rarely either constant or of very long duration, and is not unfrequently absent altogether during the whole progress of the disease of the lining membrane in complicated caries.

Hence, also, from the great nervous sympathy existing between the teeth and gums and the whole nervous system, inflammation in one tooth may produce various derangements in the others, and remote parts also, whether accompanied with tooth-ache or not.

These affections, therefore, must not be mistaken for primary diseases; they are always symptomatic; and at the moment that the violent irritation of the primary disease changes from an acute to a chronic state, or is altogether removed, the symptomatic affection will also change, or be cured.

It is a fact, liable to no exceptions whatever, that although caries in the living tooth, whether simple or complicated, may frequently be a considerable exciting cause of diseases in other teeth and other parts of the mouth or the system generally, frequently accompanied by very painful, and alarming symptoms; yet these affections are always symptomatic and temporary; and although by its chemical influence upon the other teeth, it may be an original cause of external caries, it will never produce any actual idiopathic disease of the slightest degree in any of the parts connected with the teeth; such as gum-boils, or other more serious affections of the periosteum, alveoli or maxillary bone.

This mistake of considering caries, before it has destroyed the vitality of the affected tooth, as the proximate cause of idiopathic disease of the gums, &c. has led to great errors in the treatment of such disease; and has been the reason that the most evident causes of diseases, dangerous and fatal to the teeth and general health, have frequently remained undetected for ever. Such, for instance, may very probably have been the treatment in case 11.

In every idiopathic disease of any of the above mentioned parts when occasioned by maladies of the teeth, the principal and most powerful causes are always dead roots or teeth, and sometimes also such teeth as are deformed, irregularly placed, or very loose, which may occasion morbid action from influences altogether different from those of caries.

In cases of the above kind, several teeth may be found affected with caries in its different stages, and erroneously extracted as the imputed cause of the symptomatic pain of the gums or teeth;

whereas, the real causes of the disease, such as stumps or dead and irregular teeth, from not being painful, are permitted to continue their morbid irritation.

The real exciting causes of the pain not being removed, the relief is but temporary; and those teeth, affected even with simple caries only, are so much irritated as to become as painful as those extracted, and they not unfrequently share the same fate.

Thus the actual disease, instead of being counteracted, is greatly augmented; whereas, by a judicious extraction of all the dead roots and teeth, and of such as are affected with complicated caries, deformity, or with any other disorder of their contiguous parts, in such a degree as to render their preservation either impossible or inexpedient, followed up by proper surgical treatment, all the remaining teeth and the whole mouth might be restored to perfect health.

Of the Causes of Complicated Caries.

The causes of complicated caries in its different stages, are similar to those which have been stated in treating of simple caries, but they act in a much more powerful manner upon this disease.

To these causes must be added the two distinct diseases of the tooth; viz. caries, the original and predisposing, and also most powerful exciting cause of the idiopathic inflammation and disease of the lining membrane; and the disease of this membrane, which is a most powerful exciting cause of the disease in the bony structure.

Of the Surgical Treatment of Complicated Caries.

The management of caries in this state, differs considerably from that of simple caries.

The only judicious treatment is, either the restoration of perfect health to the lining membrane of the affected tooth, and the permanent preservation of its life by removing the inflammation, however trifling, and by such subsequent treatment as is particularly calculated to preserve for the future the health and vitality of both the nerve and the bony structure: or the immediate extraction of the tooth.

Considerable judgment and experience are required in the adoption of either, but particularly in that of the former method. It is almost impossible to give a sufficient view of the circumstances which indicate the preservation or the extraction of a tooth, as a certain guide to the dentist in his proceedings.

To prevent misconception, and an erroneous consideration of the importance and capability of the preservative treatment in

this advanced stage of caries, I beg to remark, that great difficulties will frequently occur, which the dentist, without the necessary medical and surgical knowledge and manual dexterity, will not be able to overcome.

The diseased parts, which require the preservative assistance of the dentist, are so exceedingly minute as to demand the greatest ingenuity on the part of the operator to discover them; and are frequently so much hidden by the surrounding parts as not to be visible at all; the symptoms, consequently, are rendered very deceptive and uncertain, which involves the treatment in the greatest difficulties; and, moreover, in consequence of the peculiar structure of the lining membrane and the bony part of the teeth, some of the necessary operations for the treatment of complicated caries, are, undeniably, of the most difficult kind in surgery; and consequently their ultimate success must almost entirely depend on the judgment and skill of the operator.

In order to adopt a judicious treatment of caries, not only in one tooth but in the whole set, the dentist should decide at the first examination, which of the affected teeth cannot and should not be preserved, and, consequently must be extracted; and he ought to be well prepared to perform this operation in every necessary instance, and to treat every living tooth in any manner, that may be found requisite by a minute examination during the sequel of the treatment; and it must not be forgotten, that it requires a very different consideration for the extraction of teeth for the only purpose of removing pain, which is the occupation of the mere tooth-drawer; from that adopted for a perfect restoration and preservation of health of all the teeth, gums, periosteum, alveoli, and maxillary bones, which forms one of the most important, and most difficult parts of the duty of the scientific surgeon-dentist.

I will nevertheless, endeavour to point out some general rules for the treatment of such teeth as are suffering from complicated caries; but at the same time, I consider it necessary to state that these rules are liable to exceptions.

Every tooth labouring under complicated caries in its first or second stage, may be made the subject of the preservative treatment; provided there is sufficient reason for attempting its preservation; and six out of seven teeth, may be preserved and made useful for many years, and, not unfrequently during the remainder of life, by the judicious application of those remedies which will be more particularly stated in chapter vii. "Of the surgical treatment of the lining membrane of the tooth," &c. and subsequently by stopping the cavity with gold.

But it should be here particularly observed, that though circumstances might induce the opinion of very probable success, yet if the indications for the preservation of the tooth are not more powerful than those for its extraction, the latter proceeding should always be preferred.

• Inutility of the tooth, for instance, or interference with the utility or preservation of others more important and useful; the excitation, by its presence of morbid action or irritation of any kind; or the production of any other disadvantageous effect, of sufficient extent, upon the other teeth or parts, should be always considered as certain indications for an immediate removal of such tooth, not only when carious, but even though it be free from any pain or disease.

When complicated caries has advanced to its third stage that is, when the lining membrane is acutely inflamed and very painful; or when suppuration has commenced, the diseased tooth should be extracted. Various circumstances, however, will frequently occur which will present great indications for a preservative treatment, particularly if there exists the least doubt as to the advanced state of the disease in the nerve. I have often made the attempt, in instances where there was hardly any hope of a favourable result, with success beyond my most sanguine expectations. As an illustration of this fact, I beg to subjoin the following case.

CASE XXIII.

Miss G——, a young lady of Kensington, had been afflicted with violent fits of the tooth-ache, in a tooth which had been under the influence of complicated caries for eight or twelve months. It had three cavities, the effect of internal caries: and it was affected with superficial caries on two different parts of its surface.

In consequence of the importance of this tooth from various circumstances, I was induced to attempt a preservative treatment, and by a proper surgical treatment of the lining membrane; and subsequently, by stopping the cavities, and filing away the superficial caries, I succeeded in restoring it to health; which it will probably retain for fifteen or twenty years.

I treated two other teeth of this lady in the same manner, and with the same success.

It is scarcely necessary to add, that if caries has arrived at its complicated stage in any of the temporary set of teeth, they should be extracted without delay, as every attempt for their preservation would be very injudicious, and success impossible.

CHAPTER II.

Of the Morbid Influences of Dead Teeth and Roots upon the Living Teeth, the Sockets, the Maxillary Bones, and the system generally.

THE vital principle of the teeth is dependent on the membrane which lines their natural cavities, and which is known to consist chiefly of the branches of the nerve, artery and vein, through the medium of which they receive the necessary nourishment and nervous excitement.

When this membrane is destroyed by complicated caries, or from any other cause, the bony structure soon loses its vitality, and the tooth being now a dead body is no longer influenced by the disease, but by the chemical action and putrefactive process, by which it is gradually destroyed.

The crown of such dead teeth is generally very soon removed by corrosion and mechanical causes; but the roots, being more protected against both chemical and mechanical influences, are much more slowly destroyed, and principally by putrefaction; and generally require a period of from ten to fifteen years for their total absorption.

These chemical and mechanical actions, which effect the removal of such dead teeth and roots, excite constant inflammation and suppuration in the periosteum and other neighbouring parts; by which the latter are gradually destroyed, and, at the same time also the dead roots and teeth are placed under the influence of putrefaction and absorption; and thus they act upon their contiguous and more distantly surrounding parts, in the same destructive manner as the caries acts upon the living bony structure, and lining membrane of the affected tooth.

This process produces precisely the same morbid irritation upon the living teeth, their periosteum, gums, sockets and maxillary bones, as well as upon the general system, as that excited by any other gangrenous, dead, or corrosive part of the body upon its neighbouring parts, and the constitution.

The truth of these statements will be satisfactorily proved by proper examination after death.

It will always be found, that wherever there was a dead root or portion of tooth left in the mouth during the life of the subject, the gums and periosteum had been more or less diseased and under the influence of inflammation and suppuration; but in many

instances it is very difficult to distinguish the morbid state of these parts from that of health, as the apparent difference is very slight, and not always evident, even to the experienced observer.

By dissecting the affected parts, the internal spongy structure of the jaw will invariably evince very striking symptoms of inflammation, and more or less of mortification, occasionally extending to very distant parts. I have sometimes found streaks of a dard red appearance, very nearly approaching to black, beginning at the points of dead roots and proceeding to the cheek bones, occupying an extent of an inch and upwards.

By examining any number of jaw-bones, preserved as anatomical preparations, containing dead roots, the alveoli will always be found in a more or less diseased state, and sometimes the caries and mortification in these parts is evident even to the most inattentive observer. These parts are generally more or less spongy about the dead roots, and perforated by many holes, through which the matter had been discharged.

Of the symptoms produced by Dead Roots and Teeth.

By the constant irritation and morbid action occasioned by dead roots and teeth, during their putrefaction, that local inflammation is produced, which excites the whole nervous system in a greater or less degree, and causes that local and general action which nature employs for the purpose of throwing off the dead parts of bone, either by sloughing or exfoliation.

This process is slow at its commencement, and its symptoms are generally chronic, but subject to changes from that to the acute state. At a later period, they most frequently remain uninterrupted in the chronic form. In this state the inflammation generally proceeds without creating much pain in the affected parts; but when it is sufficiently excited to become acute, it may sometimes occasion great inconvenience and even violent pain.

It is necessary here to observe, that the pain which arises from acute inflammation in the periosteum or surrounding parts of the dead roots or teeth, may be sometimes very violent and not unlike the tooth-ache; whence it is often supposed that such roots or teeth still possess some vitality. This, however, is a mistaken notion, for the tooth-ache arises from disease of the lining membrane; whereas the pain of which we are now speaking is exclusively seated in the periosteum of the alveoli surrounding the dead roots or teeth.

By a careful examination it will generally be discovered, that the latter is less concentrated than the former, and more changeable from one place to another of the surrounding parts, and that by a slight pressure of the dead tooth, the pain in the surrounding

parts will be augmented; whereas, pressure against a tooth suffering from tooth-ache will generally afford temporary relief, and sometimes cause a total suspension of pain.

These painful symptoms, however, are not always produced by dead roots and teeth. They will be most frequently observed where there are but few of them; for the greater the number the more are the affected parts kept in the chronic state; whereas, by their immediate irritation upon the small fibres and diseased processes of the nerves with which they are in contact, they are particularly active in occasioning the most serious derangements both of the parts locally affected and of the whole system.

As the maladies of the mouth are rendered more complicated, they also generally become less likely to produce acute pain in the parts primarily affected, and in the proportion that the painful symptoms in the periosteum and alveoli of dead teeth and roots decrease, in consequence of the extension of diseased action, the morbid and painful symptoms and effects produced upon the whole animal economy are augmented, and tend to injure the general health, and to produce a predisposition to a great many maladies of greater or less danger and extent.

Thus dead teeth and roots may frequently be considered to form the principal cause of many nervous and rheumatic affections of a very alarming nature, and accompanied with much pain, viz. various disorders of the organs of sense, the brain, the face, the ears, the eyes, and other more distant parts, under the forms of tic douloureux, convulsions, epilepsy, hysteria, hypochondriasis, dyspepsia, and mental derangement. See cases 2, 3, 9, 10, 11, 13, 14, 16, and 35.

Dr. Rush states a case of madness occasioned by decayed teeth which were not painful: no doubt they were dead teeth. See his *Medical Enquiries upon the Diseases of the Mind*, p. 35.

He also gives instances of rheumatism in the hip joint, dyspepsia and epilepsy, cured by the removal of painful and dead teeth, and in confirmation of his opinion, he quotes three cases from other eminent physicians in his *Medical Enquiries and Observations*, part i. p. 199, which I have referred to in a previous part of this book, page 117.

If those secondary local and constitutional affections which are frequently mistaken for primary diseases, are treated as such, the symptomatic disorder will generally be much augmented. These mistakes, however, are not surprising when we consider the great difficulty there is in detecting the real primary causes, which are, consequently, too often disregarded by the patient, and not unfrequently unperceived even by the medical and surgical attendant.

We cannot, therefore, too much bear in mind that the idiopathic diseases of the mouth, even when they are in a very advan-

ced state, often occasion the least pain in the parts primarily affected; whereas the symptomatic disorders produced by them are exceedingly painful and alarming.

Of the effects produced by dead teeth and stumps upon the living teeth, the parts immediately connected with them, and the system generally.

During the slow progress of nature to rid itself of the dead parts, so much retarded by the peculiarity of their natural structure, they act as a powerful exciting cause of all the existing diseases of the teeth and of other parts, and they also form the chief original cause of caries, both external and internal, in all the remaining teeth not yet affected.

It consequently follows, that the number of diseased teeth will increase; and it often happens that before nature succeeds in removing the roots and other decayed parts first affected, every one of the remaining teeth is either destroyed, or much affected by caries, or other diseases, originally occasioned by these dead teeth.

I have often seen a mouth containing none but either dead or diseased teeth, and affected with many diseases of the surrounding parts; the miserable state of which had, in all probability, been occasioned by disease of only one or two teeth in the first instance.

Sometimes these diseases of the mouth with their morbid action and the irritation of the dead and diseased teeth, proceed regularly and slowly, if art does not interfere, until every tooth is removed, and the individual then recovers his usual health, but generally not before a late period of life, and always with considerable loss of the other parts locally affected, and also of constitutional strength.

In other instances, if this violent process of nature should, in addition to the difficulties already arising from the natural structure of the teeth, be counteracted, and should the inflammation be aggravated by other local or general obstructions, as, for instance, great irregularities of the dead roots, by which they are mechanically held in their sockets in an unnatural manner, or for an unusual length of time; irregularity of the sockets, or malformation of the maxillary bones, by which their gradual corrosion and absorption are powerfully prevented; and diseases or defects of any of the neighbouring parts, as of other bones of the head, or of the glands, or considerable derangement of the general health, which particularly predispose the parts more or less connected with the teeth; as also, improper operations, and injudiciously inserted artificial teeth: such dead roots and teeth may often produce the most dangerous and distressing primary diseases of the

mouth, viz. inflammation and suppuration, gum-boils, fistulous abscesses, scorbutic excrescences, tumours of the gums, inflammation or suppuration in the periosteum, inflammation and mortification of the alveoli and maxillary bones, and diseases of the maxillary antrum. See cases 2, 3, 4, 5, 9, 10, 11, 13, 14, 24, 25, 26, 27, 35, and 42.

At such a period of the complicated state of the malady, when the dead roots and teeth have produced any of these local diseases, either in the teeth or in their relative parts, the secondary affections, which are frequently caused by these diseases in other parts and the system generally, are naturally much more violent; because they are then the effects of two different kinds of causes of a much greater extent than before, viz. the immediate nervous irritation produced by the increased number of dead roots, and the local diseases produced by them in the other parts of the mouth.

When these idiopathic local diseases have once arrived at this extent, if art should not properly interfere, they may, not unfrequently, be followed by a fatal termination, either by producing such defective general health as gradually wears out the constitution; or by predisposing to other diseases in such a manner, that the first morbid cause uniting with the previous local diseases, may totally exhaust health and destroy life. See cases 2, 3, 13, 14, 15, 16, and 24.

At other times the local diseases of the mouth may become malignant or even cancerous, and occasion, by a slow destructive process, the loss of extensive and indispensable parts, and at length become fatal in a most painful and distressing manner. See case 4, which, with the following cases, especially No. 27, is particularly calculated to prove the above statements.

CASE XXIV.

Mrs. K. of Philadelphia, a lady about twenty-eight years of age, had been suffering for some time from an abscess under the chin, on the left side. Being ignorant of the nature of the disease, she sought no surgical aid, under a hope that it would get well of itself; but it grew worse, and was attended with a constant discharge of fetid pus, with great pain in the whole jaw and mouth, extending as far as the ear. These symptoms at last became so violent as to produce general disorder and fever. At this time, Dr. Physick was consulted, who, having discovered the malady to be a fistulous abscess passing through the under maxillary cavity and bone, immediately suspected that the teeth were the cause of it, and desired that I should be consulted. On examination, I found that three large grinders on the side affected, had been so completely carried away by decay, that the parts of the roots remaining were entirely covered by the gums, which were greatly inflamed.

1819, October 8th. These roots, six in number, were extracted: and so effectual was the relief obtained from this operation, that in a very short time the patient perfectly recovered.

October 19th. Eleven days afterwards, some chronic pain was experienced in the opposite side of the jaw, and on examination the chin was found indurated and swelled in some degree, and the points of two roots of the second large grinder, being completely covered by the gums, and hidden behind the first large grinder, were detected with great difficulty by the probe. I proposed the immediate removal of these roots, having no doubt that a new disease was forming on that side of the same nature as that on the other.

The operation was immediately assented to, and successfully performed in a few minutes, notwithstanding the great difficulties inseparable from their situation; and the parts were restored to complete health in a short time. By this early and decided treatment, the otherwise unavoidable exfoliation of the maxillary bone, which had indeed occasioned a great defect of substance, and a considerable scar on the left side of the chin, was entirely prevented on the right.

CASE XXV.

About the year 1815, a lady from the interior of Pennsylvania applied to Dr. Physick respecting a tumour of her gums over the left cuspidatus. It was of a spongy nature and about the size of a walnut, greatly disfiguring the face, and preventing the patient from shutting her mouth.

The attending surgeon of the family had repeatedly operated upon it, and had removed the tumour twice with a knife, and, I believe, on the second occasion made use of the actual cautery, but never to the effectual extirpation of the tumour. Dr. Physick objected to operate until he had obtained my opinion respecting the teeth. By a very careful examination of the gums, I found that a small part of the root of the left lateral incisor remained very deeply seated in the socket, and suspecting that to be the irritating cause, I proposed its removal, which was accordingly done immediately after Dr. Physick had extirpated the tumour. The lady left Philadelphia with the intention of returning, if a proper cure should not prove to have been effected; but as neither Dr. Physick nor myself ever heard any complaint from her before I left Philadelphia, there seems to be no doubt of her perfect recovery.

CASE XXVI.

Mr. L. of Pittsburg, consulted me on the 17th of May, 1818, on account of an abscess with which he had suffered for several years in his left cheek, produced by the dead fangs of the left first upper large grinder.

He was about thirty years of age; had an excellent constitution and enjoyed good general health. He had never suffered from any illness whatever. All his gums and teeth I found, to my great surprise, perfectly sound, although the dead roots above mentioned had excited considerable suppuration in the alveoli at their upper extremity and the maxillary cavity, and had forced an opening through the muscles of the cheek to the external surface. The discharge was so great that, during the time that the patient explained his case, two table spoonfuls at least of purulent matter ran out over the cheek. On examination, I found that nature had been so actively engaged in endeavouring to rid herself of the cause of this disagreeable malady, that the roots were quite loose and hanging on the outside of their respective sockets merely attached to the gums. The removal of these roots, and the usual surgical treatment of the fistulous opening in the cheek effected a perfect cure of the disease in a short time. A considerable depression and scar, however, remained in consequence of the long neglect of proper treatment.

CASE XXVII.

Early in the spring of 1819, I saw a case of diseased antrum. The subject was a mulatto man, who came from Virginia to Philadelphia for the benefit of surgical advice; but being afraid to submit to an operation, the success of which was, I believe, declared to him to be very doubtful, he returned to Virginia, and died in the following year.

When I saw the patient, the external appearance of his face was much like the engraving in Mr. Fox's Nat. Hist. p. 10, fig. 1, except that the swelling in the present case was rather higher up on the cheek bone. The left eye was partly closed, and the mouth and nose were pushed considerably towards the right side of the face by the tumour. The disease was in a cancerous state, and rapidly destroying the parts affected. A considerable part of the upper jaw and the palate were already destroyed, and the patient was complaining of a constant chronic pain.

He stated, on my particular inquiry, that about eight years before, he had been annoyed by some stumps in that part of the jaw; and that a physician of the neighbourhood attempted, but in vain, to extract them. He then took a pair of pincers and removed several small portions of the edges by repeated operations; but the gums becoming very sore he was obliged to desist. About two years afterwards he perceived a slight swelling in his cheek, which at the end of five years more had advanced to the state in which I saw it.

Surgical remarks on Dead Roots and Decayed Teeth.

The above facts sufficiently prove, that the only way to prevent all the pernicious and dangerous effects arising from dead teeth is, either the timely interposition of art to restore their health, or the removal of every tooth whose health cannot be restored and permanently preserved; and the only method of cure for all the idiopathic and symptomatic maladies, whether general or local, occasioned by dead roots and teeth, is their immediate extraction, they being always the principal and proximate exciting causes of the disease.

Moreover, it is evident that in the same proportion as the process of the disease is shortened, that of putrefaction is retarded and rendered more difficult; and hence the more suddenly a tooth is deprived of its vitality, the more violent and extensive are generally also its morbid effects and symptoms.

The morbid effects, therefore, of such teeth as have lost their vitality by any of the operations recommended by Messrs. Hunter and Fox, are augmented in proportion to the violence which occasioned their death; and we cannot be too much on our guard against these cruel and unnatural practices.

The unfortunate manner in which these eminent men have confounded the causes with effects; and the effects with causes, or in other words, the morbid effects produced by complicated caries with those occasioned by dead teeth; and the apparent similarity of the symptoms accompanying simple caries to those of dead teeth, seem to have induced them to attribute all those primary diseases of the mouth, and those painful symptoms which the dead teeth produce upon the general system, to the living diseased teeth only.

In consequence of this surprising misconception of the real causes, those gentlemen strongly recommend the remedies which most speedily destroy the life of the tooth, in order to prevent the symptoms and morbid effects which accompany the gradual destruction; but which hasten and augment, and even actually create the most powerful causes of the malady, for the cure of which they are adopted; and hence, such surgical treatment and operations were introduced by them, as, while they are intended to cure such teeth as are irreparably lost, injure and even destroy the health and life as well of the sound teeth as of those more or less diseased. The most lamentable effects of such practices are their general adoption at the present day on the authority of those authors, whereby not only discredit is brought upon this useful art, but also the greatest injury is inflicted upon human health and felicity.

If general surgery were practised upon similar principles, what would be said of that great art which now holds so eminent a

rank, from its real importance and utility for the preservation of human health and happiness, in the estimation of every liberal-minded philanthropist? Would it not sink beneath the lowest occupation? And would not its professors justly deserve reprobation as destroyers of mankind?

CHAPTER III.

Of the Devastation or Absorption of the Gums and Sockets of the Teeth.

THIS disease, in my opinion, is far from being accurately understood, and is generally supposed to be incurable.

The remarks which I am about to offer being the result of close observation, are well deserving of attention, inasmuch as the subject is of no inconsiderable importance, especially in this country.

In his *Natural History of the Teeth*, vol. i. p. 51, Mr. Hunter says, how far these diseases can be "prevented and cured, is, I believe, not known."

Fox differs very little from Hunter on this point in his *Nat. Hist. &c.* part ii. p. 95. He spreads on the subject in a very vague manner, and so much so, indeed, of its cure, that I am inclined to believe he never saw an example of it, at least, not after the disease had advanced to any considerable extent. At all events, the subject has not been considered with sufficient attention by these or any other writers whose works have come under my notice.

This malady has its beginning, generally, in an inflammation and suppuration of the gums, which gradually extend to the periosteum, or the alveolar processes of the teeth; or it begins by an inflammation of these parts, which is afterwards communicated to the gums; it very rarely originates in the alveoli themselves.

The inflammation and suppuration are seldom violent, and the absorption seldom rapid: in most instances it is so slow in its progress as to be scarcely perceptible, and the suppuration destroys the gums in a very gradual manner, being attended by the absorption of the alveoli and their periosteum; until the teeth, losing their support, become loose, and, at successive intervals, drop out.

The disease rarely attacks all the alveolar processes at once, but generally begins at some one part of the mouth; I have seen it commence at the incisors, though more frequently it first invades the molares.

The crowns, necks, and more especially the exposed parts of the roots, are frequently covered with a greenish glutinous substance, and with adhering tartar; the spaces between the teeth are filled up with tartar of a dark brown or greenish colour; but, sometimes, they are of the usual appearance.

In other instances I have seen them so clean as to deceive a superficial observer; but a close examination has never failed to show some tartar, adhering to the roots, and pressing on the alveolar processes, hidden under the edges of the gums, and in the spaces between the teeth.

This deceptive appearance of cleanliness, is generally the effect of improper or superficial dental operations, as scaling and cleansing the teeth, by which the tartar is but partially removed, and some permitted to remain in those very places where it is the least observed and detected, but where it causes the greatest mischief.

The gums are, for the most part, a little swelled and inflamed, and attended by a thin pus-like discharge from between them, the roots of the tooth yielding a very offensive smell. Thus these parts sometimes exhibit a tolerably healthy appearance; though never, as far as my experience has gone, have they been perfectly free from inflammation, as Hunter and Fox have stated; although I will not deny that this appearance may often deceive those who are not habitually familiar with the very minute local symptoms of the chronic disease of those parts.

Persons of robust constitutions are much more liable to this affection of the gums, than those of delicate habits; and it shows itself in its worst forms oftener after the age of thirty, than at an earlier period. The teeth of such persons are generally perfectly sound, or very little affected with caries, though I have occasionally met with exceptions to this observation.

After the age of forty or fifty, it commonly occurs in a chronic state in individuals of robust health, who have not taken proper care of their teeth; in most instances advanced age is unjustly considered to be the cause of the disease, for the malady might generally be prevented, and the teeth preserved during life, by a proper care, and a judicious dental treatment.

The lower classes are particularly subject to this affection; and not even those country people who enjoy uninterrupted good health, and the influence of the most salubrious atmosphere, and who have originally the most beautiful and healthy teeth, are altogether free from its attacks. In these persons, although possessing robust health when young, in consequence of an entire disregard of cleanliness, and a greater predisposition to the production of tartar from various general causes, at a late period of life, a great quantity of tartar is accumulated, and the teeth, though entirely free from caries, are frequently lost one after another, by this destructive malady of their gums and contiguous parts.

This disease seems to be confined to no particular climate, and is more or less prevalent in every part of the world: I have ob-

served the inhabitants of the most opposite countries, the Russians, the Germans, the French, the Italians, the Spaniards, the Portuguese, the English, the Africans, the East and the West Indians, and the inhabitants of the United States, to be all more or less liable to it.

The late Dr. La Roche, of Philadelphia, informed me that he had frequently seen this disease in the French Colonies at St. Domingo, and in persons of different ages: that its progress was very rapid, and probably from its frequency, that it was generally considered peculiar to the climate, and altogether incurable.

In the United States of America, this malady is much less frequent among the natives than amongst those foreigners who arrive there with a robust constitution and sound teeth, as the former are generally of less plethoric habits, and more subject than the latter to those diseases which primarily affect the teeth, and produce secondary affections of the parts connected with them: still, however, the Americans are often subject to its destructive ravages.

During my short practice at Lancaster, in Pennsylvania, in 1812, I saw a gentleman, a native of that state, aged about forty-five, and of a very strong and excellent constitution, who had been deprived of the use of all his teeth from this disease. He showed me about twenty, which were tolerably sound, and he stated, that about ten years had passed before the whole were lost.

During that period he suffered much pain, and enjoyed neither peace nor comfort, till he was deprived of every tooth; and he was so contented with the relief which the entire loss of his teeth occasioned, that my proposition to supply him with a set of artificial ones was rejected without the least hesitation.

In England, however, this malady is of exceedingly frequent occurrence, and I have had repeated opportunities of seeing it, especially amongst individuals who have returned, after residing for some time in the East and West Indies. During my short practice in London, not less than two-thirds of the number of persons above the age of forty, who have consulted me, suffered from it in a more or less considerable degree, but in its incipient state it may be observed in individuals of almost every age after puberty.

This appears quite consistent with the peculiar tendency of the disease, to attack chiefly such subjects as possess vigorous health and sound teeth, and these, according to my observation, from the stimulant atmosphere of this country, and the wholesome nourishing diet generally enjoyed by its inhabitants, are much more frequent in England, than in any other part of the world.

Of the Symptoms.

For a considerable time, even for many years, the symptoms accompanying this disease may entirely escape the attention not only of the patient, but that of a surgical attendant, not well acquainted with this disease.

The matter which is discharged, is, in the first stage of the disease, very trifling, and constantly removed by the saliva and by mastication; and the inconvenience and pain accompanying the malady are so slight, and the progress of it so gradual and regular, that it may sometimes go on, even for ten years and upwards before it is observed, or the least suspected by the patient to be a source of danger and injury, either to his teeth, or to his general health.

Indeed, when it has already committed considerable ravages, and arrived at an advanced state, the local inconvenience and pain are generally far less evident and extensive than its morbid effects upon the general system; in consequence of which, the local disease is not unfrequently considered symptomatic, and again from this cause erroneously disregarded and permitted to proceed in its more rapid devastation.

When the malady has arrived at that state, however, when all the periosteum and alveoli, together with the gums, are more or less inflamed, considerable pain may sometimes affect the diseased parts, and the irritation produced upon the whole system is very great, and sometimes dangerous.

From that peculiar sympathy existing between the teeth and their relative parts, and between these and the general constitution, the whole nervous system is kept in a state of more or less excitement, and the same symptoms and nervous derangements, as are produced by dead roots and teeth, are very frequent consequences of the local disease.

Such teeth, however, as are so much deprived of their periosteum and sockets as to be rendered loose, produce even much more violent irritation upon the general nervous system, than such as are dead and diseased: the malady, thus aggravated by many loose teeth, is, in this advanced state, almost invariably accompanied by local and general symptomatic affections of some kind or other; viz. chronic pains in all the teeth and their relative parts, rheumatism, pains and symptomatic diseases of those parts of the system are most nearly connected with the teeth and gums: such as, diseases and inflammation of the glands, soreness of the throat, various kinds of head-ache, pain of the face, tic douloureux, inflammation and diseases of the eyes, ear-ache, defective smell and taste, and not unfrequently, indeed, this malady is also accompanied with pains and affections in very distant parts of the body: as dyspepsia, and derangement of the alimentary canal, &c.

Indeed, so great is the morbid influence of this malady upon the general system, that after a perfect, cure of the local disease has been effected, not only all these symptomatic affections subside, but the general health for the first year or two, invariably improves in a most surprising manner, and the constitution recovers that natural strength and vigour, of which it had been deprived for perhaps ten or fifteen years.

This recovery, being dependent on the slow restoration of the healthy functions of the sockets and jaw-bones, which always labour under extensive diseased action during the local disease, is, however, so gradual as generally to deceive the patient as well as the medical attendant, and is consequently attributed to very erroneous causes, and I have, not unfrequently, found the greatest difficulty to impress the patient with the only just and rational notions on the subject.

CASE XXVIII.

In June, 1815, I was consulted by two persons suffering from this cruel disease, Mrs. B—— from Bristol, and Mr. H—— from Binfield, both of whom were labouring under general nervous derangements and depression of spirits; the lady in particular had been afflicted at different times for more than five years, with almost all the symptoms of this malady in its most advanced stages.

I extracted eleven teeth from the mouth of Mrs. B——, and three from that of Mr. H——, and, by proper treatment of the local disease, the general health was restored to both, which they continued to enjoy when I had the last opportunity of seeing them.

CASE XXIX.

Alexander Stuart, aged sixty-four, had lost all his teeth from this destructive disease, except two upper, and one of the under cuspidati, which had been for some time very loose and painful. His sight had been declining for above fifteen years, and one of his eyes had been affected with incipient cataract for about five years. In January, 1824, he requested my assistance for some acute inflammation of his mouth. One of the above canine teeth, the principal cause of the inflammation, was immediately extracted, and at the same time I gave my opinion, that, by the removal of the other two, not only his mouth would be restored to perfect and permanent health, but, most probably also, very salutary effects might be produced with regard to his sight; in consideration of this, he consented to their immediate extraction.

My anticipation proved just, for by this treatment the disease of the mouth was perfectly cured in one or two days, and since

that period not only has the general health of the patient been much benefitted, but the pain and weakness of his eyes have greatly diminished, and their sight has gradually much improved.

October, 1815. The patient is now under the care of Mr. Lawrence, and by the humane and skilful treatment he receives from that excellent surgeon, not only will the left eye be perfectly cured, but great hopes are entertained of the complete recovery of the sight of the other, which was affected with the cataract.

CASE XXX.

Mr. J——, a gentleman of great respectability, a native of this country, but for many years a resident of Smyrna, aged about thirty-nine, had suffered upwards of ten years from this distressing malady, attended by all its torturing symptoms in a most unparalleled manner. His whole constitution, but particularly the glandular system, was so much affected as to produce swellings and indurations in the most distant parts, accompanied with great pain and inconvenience; but its effects on his head were frequently agonizing; indeed, he assured me, that so great were his sufferings, that he had been so far driven to despair, as to implore heaven to relieve him by putting an end to his miserable existence. He repeatedly applied for the best medical and surgical advice that the country could afford; but the real causes of his sufferings were not detected; and such was the character of his disorder, that it baffled every exertion and all the remedies which were applied for many years. At length the effects of a sea voyage and a visit to his native country were proposed, and at the same time a trial of such remedial measures as he might be able to command in England.

Immediately after his arrival in London, this patient consulted Mr. Lawrence. This sagacious and disinterested surgeon soon suspected his teeth to be the chief cause of his malady, and recommended him to have my advice without delay, and to submit to any treatment I should deem necessary and proper.

On examining the gentleman's mouth I found his gums and all his alveolar processes more or less diseased. His double teeth, however, had most especially suffered: and so considerable a part of their sockets was destroyed, that their preservation was rendered altogether impossible. I therefore proposed their immediate removal; and, although the gentleman was exceedingly nervous, he acceded to my proposed plan of cure without the least hesitation.

February 14th, 1826. Thirteen roots and teeth were extracted, and the mouth was subsequently cleansed with a gentle stimulant lotion every hour or two in the course of the day.

February 21st. The remaining front teeth of the upper and under jaw were carefully scaled as far as the diseased state of their gums would allow of, and the patient provided with the means of preventing the re-accumulation of tartar. He was requested to continue the use of the lotion.

February 28th. The above operation was repeated, and cleanliness particularly recommended.

March 7th. The same operation was completed, and a perfect removal of the tartar was accomplished: the patient was also directed to proceed as before.

Thus by the judicious management of the case by Mr. Lawrence, and the above treatment, the patient was now, in less than one month, restored to perfect constitutional health. His mouth was rapidly recovering from a disease, probably of more than fifteen years standing; and the most important of his teeth were saved from total destruction, and permanently preserved.

He left London a few days after the last operation, to visit his relatives in the country, full of spirits; and intending to return in a few months, to submit to some further necessary treatment to prevent a relapse of the disease of his gums, and then to leave England for his Asiatic residence with a vigorous constitution, and a mouth perfectly healthy and comfortable.

Of the Causes.

Amongst the remote causes of this disease may be enumerated a scorbutic and scrofulous habit of the gums, frequent and inordinate use of mercury, and narcotic medicines, great irregularities in the position of the teeth, neglect of cleanliness, improper manner of brushing the teeth, smoking and chewing of tobacco, too great indulgence in the use of spirituous liquors, operations of different kinds injudiciously performed, such for example, as the filing of the teeth when the general state of the mouth from an imperfect healthy action, is not capable of bearing the unavoidable irritation which it occasions, or where too great violence is used in this operation even in a healthy state of the mouth; the operation of scaling the teeth imperfectly and unskilfully performed; and the use of certain objectionable tooth powders, such as charcoal, from the irritation which it mechanically excites in the gums by its cutting quality, &c.

By the above causes a collection of tartar, without which I have never seen the disease, is deposited upon particular parts of the teeth; and this becomes the immediate exciting cause of the disease; and so long as it is suffered to remain, entirely prevents the success of such efforts as nature or medicine may make for the accomplishment of a cure.

When the disease has advanced so far that some of the teeth have become so much exposed as to be loosened, they prove another and a very powerfully aggravating cause; and the disease may be considered to be in its most violent stage, and gradually advancing to its crisis. From the constant increase of these causes, all the teeth will gradually become loose in the same proportion as they come out one after the other, until, in a period of from five to ten years, by the removal of all of them, a perfect cure is effected by this protracted diseased action; unless the constitution is previously worn out.

Of the Method of Treatment.

I have always succeeded in curing this disease in all its different stages by the mode of treatment, which I am now about to describe.

It consists, first, in checking the diseased action which has become habitual, and in producing a general healthy disposition in the diseased parts, and those connected with them, by removing the actual causes; and, secondly, in preventing their recurrence.

The first object is to be obtained by extracting those teeth, of which the periosteum and alveoli are too much affected by the disease to be capable of permanent restoration, and by a complete removal of the tartar and glutinous matter covering the remaining teeth and their exposed necks, which produces the irritation in the alveolar processes.

The second indication will be answered by removing such remote causes as may still exist, or, if this cannot be done, by counteracting their influence. When these are of a general nature, as scurvy, scrofula, or the effects of mercury, constitutional remedies combined with topical means are required. When local, however, that treatment only, to which I now beg to draw the particular attention of the reader, is demanded.

The remedies to be prescribed for the removal of the local causes mentioned, are of very great importance, and require the most particular and decisive consideration.

Such teeth as excite constant irritation from their unnatural irritation, either on the opposite teeth or on the gums and alveoli, should be removed, or the effects of their irregularities prevented.

Operations injudiciously performed require such remedies as will remove the injurious effects resulting from them. When the individual has been neglectful in cleansing the teeth, or when this has been done in an improper manner, great attention is required on the part of the dentist to prevent the accumulation of tartar.

With the foregoing measures may be combined the use of some astringent or tonic washes, such as diluted tincture of Peruvian bark, or myrrh, which I have found very serviceable; but all power-

fully stimulant tinctures should be avoided altogether, or used with the utmost caution and judgment.

Considerable experience and skill are required to distinguish at once between those teeth which are capable of preservation, and such as ought to be extracted : inasmuch as the principal curative means for this disease are the removal of teeth, so much injured as to have become a directly exciting cause of its farther progress, as well as of those which, from a variety of circumstances, operate as indirect causes and must unavoidably become, in the progress of time, sources of irritation and of a morbid condition of the surrounding parts. The disease being so far advanced as to render it necessary to extract some of the teeth, this operation must precede every other remedial attempt ; since, by omitting this a cure is impossible, and all other operations will not only prove fruitless, but will have an immediate tendency to increase the irritability of the affected parts, and the violence and rapidity of the disease itself.

It is hence a matter of considerable importance to establish some guide, as far at least as the intricacy of the subject will allow, by which we may be directed in deciding in those circumstances, whether we should extract the teeth, or make efforts to preserve them.

The incisors and cuspidati being the most important teeth, the main attention is always to be directed to them. They are, fortunately, from their natural situation, and from their peculiar formation and functions, capable of suffering longer from this disease without being destroyed than any of the other teeth. They may, indeed, be preserved even when not more than one-half of the alveolar processes remains, provided that a considerable portion of the fang continues united to the alveolus by its periosteum. I would always endeavour to preserve these teeth, unless indeed they were very loose. When more, however, than one-half of the alveolar cavity is absorbed, or when the tooth is very loose or has lost its vitality, it must be extracted for the benefit of those adjoining.

The bicuspidés and molares are much less capable of being preserved than those just mentioned, and the process of mastication causes a greater mechanical irritation. They are also more inconveniently situated and formed, and generally have several roots ; in consequence of which the difficulty of keeping them free from tartar is much increased. Hence they should be extracted : first, when they are very loose ; as I consider teeth, in this state, a direct cause of disease from the constant irritation which they occasion in the alveoli : secondly, when the alveolar processes have receded from them so much as to expose the space between the fangs of the tooth ; as it will then be impossible to prevent

the accumulation of tartar in these places, by which these teeth are rendered such causes of the malady as must inevitably augment the inflammation. Moreover, the suppuration cannot fail to be kept up by the irritation of the tartar, until the tooth becomes loose, and is thus rendered both a direct and an indirect exciting cause of the disease.

Not one of the molares should be permitted to remain that has no antagonist, particularly if it is situated in the upper jaw; inasmuch as such teeth, being deprived of that necessary stimulus which arises from mastication, their periosteum soon becomes relaxed, and consequently predisposed to this disease: besides, the utility of such teeth being lost by the want of an opposing surface to act against, they influence the surrounding parts like extraneous bodies.

Should there be, for instance, an interval between two opposite teeth when the jaws are closed, nature uniformly attempts to remedy the evil; and for this purpose the cavity of the alveolus contracts at the base, and drives out the tooth until it meets its opponent, by which the necessary stimulus is restored and the morbid action cured. In this manner the loss of one molar tooth produces the destruction of its remaining antagonist. This is effected, however, after a struggle of nature, of very long duration which will always involve, in some degree, all the other teeth in a like diseased condition; it is necessary, therefore, to prevent this morbid action, particularly pernicious in this disease, by the extraction of the tooth, or any molar tooth so situated.

Every tooth which has lost its vitality, including all stumps, and all such teeth as from their irregular situation or direction excite a mechanical irritation, provided this irregularity cannot be remedied by filing, or by cutting away the irritating parts, should also be removed.

All operations should be performed with the greatest judgment and caution, and all teeth to be removed must be extracted at the same sitting, because it would either partly, or altogether, obviate the desired effects, if this particular operation were performed at different times. This advice is the result of much experience, and should, if possible, be always adopted to insure a successful cure.

The bleeding from the sockets should be encouraged by warm water taken into the mouth at sort intervals, during the different operations, and continued for some time; as its effects are of much importance.

A gentle astringent wash may be subsequently employed for several days. I have generally found the following simple preparations the most useful.

Take of clarified honey, three ounces, and of vinegar, one ounce. This, diluted in the proportion of three table-spoonfuls to a pint of warm sage tea, or water, may be used frequently during the day.

Take of clarified honey and of the tincture of bark, two ounces each. Mix and dilute as above.

Take of honey and of the tincture of myrrh, two ounces each. Mix and use as above.

Take of honey and of the tincture of rhatania, two ounces each. Mix and dilute as above.

Take of honey and of the tincture of catechu, one ounce each. Mix, dilute, and use as above.

In about ten or fourteen days after the removal of the teeth, the inflammation considerably subsides, the gums assume a more healthy appearance, and the teeth become firm in their sockets.

The tartar should now be removed; but there is often much difficulty in doing this well. It adheres so firmly to the neck or roots of the tooth, which are generally loose, and it is attached so closely to the alveolar processes, and is in many cases so covered by the edges of the gums, and so hidden between the teeth, that it is not without the utmost care that we are able to avoid irritating the gums and periosteum with the instruments employed. The operation, on this account, is to be performed with great caution and tenderness, in order to effect a perfect removal of the tartar without making the teeth still looser. Instead of believing that the removal of all the tartar at the same time can endanger the teeth by exposing them, as is erroneously asserted by Mr. Fox; it seems to me, that the sooner they are relieved from so pernicious a coating, the more we contribute to their preservation; yet we are in this case often under the necessity of contenting ourselves with the removal of only a portion of it at a time, and of the remainder by two or three future operations, after a lapse of eight or ten days. As the tartar is most injurious in those parts where it presses upon the alveolar processes, it is highly necessary that every particle of it should be removed from those places.

After the stony matter, or hard tartar, has been taken away, the removal of the green mucus is an important part of the operation. This cannot be effected with instruments. It may be done by dipping a piece of thick leather, or soft wood, into some dissolving tooth-powder or liquid, and then rubbing the surfaces of the roots and crowns of the teeth with it, to be followed by the use of a soft brush.

The dentist's care is now to be directed to the prevention of the re-accumulation of the tartar; for a perfect cure depends not only on the entire removal of the tartar, but also on the permanent prevention of its recurrence.

To effect this purpose satisfactorily, is an arduous task. There is always much predisposition to form new tartar, and the difficulty of preventing it from settling on the teeth and fangs, is augmented by the great irritability and tenderness of the gums, the debilitated state of the periosteum, and the inflammation of the alveoli. The frequent repetition of scaling the teeth with instruments cannot prove a substitute for the duty of keeping them constantly clean; on the contrary, it has a tendency to produce repeated irritation, and the benefit, to be derived from the operation, cannot be obtained without proper care afterwards. Mechanical means alone, are, for the most part, either insufficient for this purpose, or too violent: and powerful chemical means are apt to occasion destructive diseases of the teeth themselves. The only method, therefore, which remains, is to use these means together, by which the bad effects of both may be avoided, and their advantages combined.

The rule to guide us in applying these remedies is, that the more the disease has advanced the more the chemical agency is indicated, and the more carefully is the mechanical power to be applied.

After the scaling off the tartar from the teeth, the patient must clean them every morning, and after every meal, with an astringent powder, possessing a sufficient dissolving power upon the tartar in its soft and early state, and with a brush as hard as can be used without producing much pain and irritation. After this process has been continued about a month, and the re-accumulation of tartar found to be completely prevented, the powder should be used morning and evening only, and the brush and water after every meal. The brush used should be harder, in proportion as the health of the parts improves, and so formed as to clean the spaces between the teeth, and to give a mechanical stimulus to the gums; which is highly beneficial to these parts.

The internal gums are considerably harder, and less irritable than the external; a fact not hitherto noticed, as far as my observation extends, and the tartar accumulates much more rapidly on the inner, than on the outer side of the teeth; hence, a different brush is required for each surface: that for the internal, should be made of fine and select hog's bristles, and cut in a conical form, about three-fourths of an inch in length; and that for the external, is to be made of an oblong shape, of the best white horse-hair, and cut about two-thirds of an inch long, somewhat to an edge; and both, as the disease decreases, may be used a little shorter and harder.

The patient should be directed to press against the gums and teeth with the brush, as hard as he can bear, so that the bristles may enter between the teeth, and between the edges of the gums

and the roots of the teeth. The pressure of the brush is to be applied in the direction from the crowns of the teeth towards the roots, so that the mucus, which adheres to the roots under the edges of the gums, may be completely detached, and, after that, removed by the friction in a direction towards the grinding surfaces. This mode of brushing the teeth, which I direct to be adopted, is entirely the reverse of that recommended by every writer on the subject, whom I have consulted. They all advise the brush to be applied from and over the gums towards the teeth, the consequence of which is, that the tartar remains fixed close to the alveolar processes, and that some mucus is pressed into the spaces at each brushing. The intention they have in advising the brush to be thus used, is, to excite the gums to grow over the roots again; but, instead of effecting this, much injury will certainly follow such practice.

There is a natural tendency in the edges of the gums to recover their place, provided every thing obstructing this effort is always removed; but when the sockets and periosteum are destroyed, the detached covering of the gums is very injurious, and can only be reproduced by allowing the edges or processes of the gums to become diseased, and so much inflamed as to form an unnatural increase of these parts, similar to excrescences; this is generally the result of some local irritation, such as tartar or caries, by the irritation of which the absorption of the alveoli proceeds very rapidly, and without interruption.

Mr. Hunter considered that good effects resulted from repeatedly scarifying the gums. Mr. Fox also thinks that great benefit arises from this operation. To me it has always appeared to afford temporary relief only, and to be of no real benefit in permanently arresting the progress of the disease. It should, I think, be discarded: since, though palliative in its immediate tendency, it will occasion delay in the use of a more efficacious treatment. By the extraction of one tooth, when its removal is really indicated, more benefit arises than from fifty scarifications: and if the disease be not so far gone as to require the extraction of any teeth, the immediate removal of the tartar has the same effect. If there is an inflammation in the gums, the mere unavoidable pressure of the instruments on them in scaling the teeth, must occasion some bleeding; which, together with the removal of the exciting cause, the tartar, is much better calculated to remove the inflammation than repeated scarification.

The common practice of fastening such teeth as are very loose, by ligatures to the contiguous teeth, as recommended by Fox, is also very injurious, and should never be resorted to, even in such cases where a radical cure cannot be expected. Teeth which are fit for preservation will grow firm by restoring the tone of

their periosteum, and the other surrounding parts; and this is to be effected by the remedies already indicated. The ligature not only prevents such teeth from becoming firm, but also tends to loosen those to which they are attached. The gold wire, however thin and pure it may be, has not sufficient elasticity to permit the loose teeth to grow in their natural situation, or to be applied without producing some irritating pressure on the gums and the periosteum of the adjacent teeth. If of silk, the ligature will shrink when it becomes wetted with the saliva, and thereby create a constant straining upon the teeth, and hence upon the diseased parts also.

The operations which are necessary to be performed upon decayed teeth, such as plugging, filing, or cutting out carious parts, must be deferred until they have acquired sufficient health and vigour to support the irritation which they cause. I have generally delayed these operations for three months, as an attempt to perform them too early, may not only bring on a relapse of the disease, but also prevent the successful result of the operations.

The introduction of artificial teeth should, if possible, be avoided, and made use of in these cases only from imperious necessity: when they should be prepared with the greatest care and accuracy, in order to prevent any injurious mechanical influence upon the gums, and those teeth which come in contact with them.

For a more particular description of the treatment of this disease, I beg the reader's attention to the following case.

CASE XXXI.

On the 3rd of May, 1818, Mr. M. of Baltimore, consulted me on the subject of his teeth. On examination, I found that he had suffered a considerable devastation of the gums. Nearly half of the sockets of the incisors and cuspid teeth of both jaws were destroyed, the upper somewhat more than the lower; the teeth were rather loose. The sockets of the second molar teeth of both jaws, also, had suffered almost as much as those of the incisors. The latter were not loose; but the partitions of the alveolar cavities between the roots were sufficiently absorbed to allow a passage to a probe between the roots. Those of the upper *dentes sapientiæ* were not so much injured; and their antagonists, the two lower *dentes sapientiæ*, were the only teeth which the patient had lost. The sockets of the bicuspid and of the first molar teeth had suffered less than any other. Their roots were exposed about one eighth of an inch. The gums were slightly inflamed, and there was a small discharge of a whitish matter all round their edges, from between the fangs of the teeth and the edges of the gums.

The patient had always paid great attention to cleanliness ; and there was not, therefore, much tartar on the teeth ; yet they were not entirely free from it, particularly the fangs, to which there was a considerable portion adhering close to the edge of the sockets. The teeth were all tolerably healthy, and only one had been painful. They were well and handsomely formed, and regular in their position with the exception of the first under bicuspid tooth on the right side which was pressed outwards, and which, therefore, acted unnaturally upon the opposite cuspid and first bicuspid.

The gentleman was about thirty-two years old, of an excellent constitution ; and he had never, to his recollection, been seriously ill for a single day.

About three years previously to his consulting me, he applied for advice to one of the most respectable dentists of Paris, who, after examining his teeth, told him that his mouth was labouring under the consequences of venereal affection, and advised him to apply to a physician. The gentleman, however, assured him that it was impossible, as he never had the slightest taint of a venereal character. The dentist persisted in his assertion, and told him that the state of his gums rendered his opinion altogether certain, whatever the patient might declare to the contrary. Disgusted with such ignorance and presumption, the gentleman left him, but neglected to take any further advice.

Several weeks before I saw him, he was obliged, by a violent tooth-ache, to apply to a dentist of Baltimore to relieve him from this distressing affliction. The dentist, however, refused to extract the tooth, alleging that its removal was unnecessary, as he would, in a few years, lose all his teeth. The gentleman forgot his pain, left the dentist, by whom he was much alarmed, and resolved to consult me on the subject, which intention was immediately communicated by letter. When I saw him, I conceived that I hazarded nothing by asserting, that I had great hopes of preserving all those teeth which were most important. I found him perfectly willing to submit to any plan or cure I should think proper to adopt.

I therefore extracted the two upper dentes sapientiæ which had lost their antagonists, the four second molar teeth, of which the roots were so much exposed as to preclude every hope of success in attempting to save them, and the first bicuspid of the right side, of which the irregularity had been noticed. After the operation, warm water only was freely used until the next day, with a view to excite the salutary bleeding from the sockets.

When I saw my patient again, he was entirely free from pain; the bleeding which succeeded the operation, had removed the inflammation of the gums, and he felt so well that I did not hesitate to comply with his request to proceed on the next day with the operation, as he was anxious to return to Baltimore. Conformably to this design, I carefully removed the tartar from his teeth, and on the subsequent day he left the city to return home. I was afterwards informed that he was in good health, and I did not see him for a long time. The disease was entirely removed, his teeth had grown firm, and the gums were free from inflammation. From the absorption going on in the sockets, from which the teeth had been extracted, he had not been able to keep them perfectly free from tartar, and a second operation of scaling his teeth became necessary, which took place about one year after the former treatment.

His teeth were perfectly clean, and the gums and sockets were quite healthy in the month of September, 1819, when one of them was plugged with gold, and the carious parts of the incisors cut and filed out. I provided him with tooth powder, and requested him to observe rigid exactness with regard to cleanliness. Since that time I have frequently heard from him, and without complaint.



CHAPTER IV.

ON THE OPERATION OF EXTRACTING TEETH AND ROOTS.

Remarks on the Importance of the Operation of Extraction.

It may be justly asserted that there is scarcely an individual, who is not at some time or other, obliged to submit to this operation. The infant in the cradle and the aged man; the savage as well as the inhabitant of the most civilized nation, are all obliged either to submit to this remedy, or to endure the many painful affections, both local and constitutional, which never fail to result from the omission of this operation, when really indicated.

When we consider the frequent necessity for this operation, and its beneficial effects even only so far as it regards its physical influences, the great importance of it seems to be placed beyond any doubt; and, indeed on all accounts, it must be allowed that there is not an operation in any branch of surgery, more worthy of the particular consideration of the liberal-minded and scientific surgeon, than that which is the subject of our present remarks. It is moreover, generally regarded by the patient, whatever may be his natural character, with so much fear and horror, that, if we take into due consideration the influence of this apprehension upon the mind as well as upon the body, and especially the appall-

ing and injurious effects which it so frequently produces upon delicate women and children, who are so sensibly alive to all the painful impressions arising from fear; it seems entitled to the most anxious endeavours of the dentist, not only to allay the unnecessary sufferings incident to the performance of this operation; but, also, as much as possible to remove this dreadful apprehension; which, on some occasions, is not less painful or less injurious.

It is a most lamentable circumstance, that perhaps no one surgical operation is more abused by ignorance and quackery than that of extracting teeth. It is very much to be regretted that this abuse is chiefly attributable to the general profession of the healing art, which has for centuries unjustly withheld from this important remedy the consideration and rank, which it unquestionably ought to receive in surgery.

The causes of this inattention are, indeed, the numerous difficulties and inconveniences which attend this operation. This fact will, I trust, be sufficiently proved in the sequel of the present chapter; which I hope will place this operation in a light totally different from that in which it has hitherto been regarded, and, consequently, furnish an additional motive for serious consideration, with a view to rescue so important and effectual a remedy from the baneful influence of prejudice and unmerited contempt.

To every one who is aware of the great importance of this operation, not only in dental surgery, but in medicine in general, nothing can afford a more delightful opportunity for exercising humanity and skill; whilst not one part of surgery will be found, on examination, more capable of improvement, or more worthy of studious professional attention than that under our consideration. It seems quite-unnecessary for me to offer arguments in proof of this statement to the liberal-minded reader, possessing any acquaintance with the subject, but to those who have not reflected upon it, it seems to be requisite: and I have to request to be indulged with a small portion of their time, and a little patient attention, while I endeavour to convince them that nothing but illiberality, prejudice, or great ignorance, can excuse indifference to the importance of this operation.

It is not improbable that, from the influence of such sentiments, it might be advanced, that as teeth are so frequently extracted by the most unskilful and ignorant men, and by the most daring pretenders, there can be neither great difficulty nor great importance in the performance of such an operation. But the removal of teeth and roots when performed by such persons, I am bold enough to assert, is attended with great risk for want of that judgment on which the beneficial effect wholly depends; whilst a great deal of unnecessary pain, frequent failure, and in too many

cases, the most distressing and dangerous consequences will be produced. Cases of this kind, however, are not generally known from various circumstances; but particularly from the great difficulty there is in distinguishing between the injurious effects of operations of this kind attributable to the incompetency of the operator, and those accidents, without which, such operations cannot be performed; and this difficulty is rendered the greater in proportion to the length of time elapsed since the performance of such unsuccessful operation was attempted.

The illiberal and irrational assertion, stated in the preceding paragraph, might indeed be applied to every other surgical operation, and the ignorant and daring operator would deserve as much confidence for the amputation of an important limb as the ignorant tooth-drawer, if it were not for the greater facility of detecting such criminal ignorance and audacity in the former than in the latter.

The capability of extracting teeth judiciously and skilfully does not depend on an occasional or limited success, or on performing it in the usual manner; but on the possession of those qualifications which enable the operator to perform this duty in every case in which the operation is indicated, and in being capable of surmounting all the difficulties, either previously known or unexpected, which might counteract the success of the operation. This is a task which is not only out of the power of the general surgeon, unless qualified by much practice and experience, but may indeed sometimes embarrass even the most skilful dental operator; not to mention the total incapability of the unskilful and ignorant practitioner.

Of the Remedial Effects of Extracting Teeth.

To be convinced of the great utility and importance of this operation for the removal of dead roots and teeth; and of such teeth as are so situated and affected as to become the cause of diseases of important parts of the mouth, it is only necessary to consider how many painful and distressing diseases such teeth produce upon the remote, as well as contiguous parts. This I have repeatedly mentioned in preceding parts of this volume, but the dangerous notion that teeth and roots, which have lost their vitality, are not productive of injury, since they are no longer painful, is still, however, so generally entertained, not only by the public at large, but also even by dentists, that I think it my duty to repeat my opinions on the subject, in order to do the utmost to prevent the encouragement of such errors.

A due consideration of these remarks will, I hope, be sufficient to remove these prejudices, and to correct these errors which are so pregnant with danger, and discreditable to dental surgery.

In the mind of the public, these prejudices are the consequences of an insufficient acquaintance with the subject, and are not at all surprising when they are communicated to them by the professors of dental surgery; but although they may be very excusable in the public generally, they can, indeed, only be founded, as it regards the profession, either on false principles, or on unpardonable ignorance, and, perhaps, on want of proper ability to perform the operation in all the instances in which it is indicated.

Such a theory is entirely in opposition to all correct physiological and pathological principles and experience, and even to common sense. In fact, the removal of dead roots and teeth, and of such teeth as are primarily diseased to a certain extent, is one of the principal curative measures in the treatment of all the diseases of the teeth and their relative parts, and is, also, one of the most necessary and important operations in dental surgery.

The dentist, therefore, who is not perfectly competent to perform this operation, is no more qualified for his profession, than an architect who is incapable of laying a proper foundation, for erecting a durable building.

In the proper management of the shedding of the teeth; in order to prevent and relieve pain; and to counteract any irregularity of the permanent set of teeth; in fact, in every treatment which is intended either for the cure or prevention of diseases of the teeth, this operation is one of the most useful and most frequently indicated.

In all those cases of disease, occasioned by dead or diseased teeth or roots, where the quack or unskilful operator would palliate the malady with his numerous draughts, which are, at the best, only temporary remedies, and never fail eventually to aggravate and to multiply the diseases, and to increase the pain; the judicious dentist effects an instantaneous and perfect cure, by resorting at once to that remedy which removes the proximate cause.

In illustration of the fact stated, I may, indeed, refer to almost all the cases related in this volume, in none of which, where this operation has been performed, could a complete and permanent cure have been effected without the extraction of such teeth as formed the principal causes of the various diseases, in every respective case.

Of the Defects of the present modes of performing the operation of Extracting Teeth and Roots.

It has already been stated, that dental surgery has been, lately, much improved, so far as it regards the natural history of the teeth, but that in its practical and operative part, little or nothing has been done for a long period. This is strikingly proved by the present method of performing the operation of extracting teeth.

The apparatus used at the present time is exceedingly imperfect, and perhaps more so than that of any other department of surgery. The frequent improper performance of this operation, the consequent great suffering, and the failure of success, are owing to the want of suitable instruments, and sufficient skill in the operators, and these are also the chief causes of that dread with which this operation is regarded.

The instruments generally used are, the punch, the pelican, the key, and some pairs of forceps. These instruments are not well adapted for general use in the extraction of teeth. The general effect of their use might be denominated the breaking out rather than the extraction of teeth.

The punch is principally intended to remove stumps or roots; but it is very ill adapted for the performance of that operation, and in almost every instance better contrived instruments might be substituted.

Besides, as great physical force is frequently required in the application of this instrument, it is more liable, when injudiciously employed, to injure the other parts of the mouth, than any other instrument; and, consequently, it becomes a dangerous weapon in the hands of the inexperienced or irresolute operator.

CASE XXXII.

About fifteen years ago, I saw a lady tortured in the most pitiable manner, and absolutely driven about the room by a famous tooth-drawer, who, in a city of fifty thousand inhabitants, had a great reputation for skill and dexterity in the extraction of teeth.

I was present when he was using the punch, and endeavouring to drive out with it the second large grinder of the right side of the under jaw.

After having tormented the poor lady for more than fifteen minutes to such a degree as to render the sight of her suffering quite insupportable to the by-standers, he succeeded at last by a violent effort in *breaking out* the tooth; but in doing this, he gave her so severe a blow on the cheek, that her face was greatly disfigured for more than a fortnight.

This very badly performed operation, which was productive of so much unnecessary and protracted pain, and of such unpleasant consequences, might have been perfectly well performed in one second of time, with only a slight momentary pain, and no unpleasant consequences whatever.

The pelican is the origin of that improved instrument which is called the key; it possesses all the bad properties of that instrument, without its improvements; but it is at the same time so little used, as to be almost entirely superseded by the key; and I need not,

therefore, say any thing further about it, except expressing my sincere wish that it may be altogether abandoned by the profession.

The key is the pelican improved, and the general vade mecum of dentists, and every other dental operator. It is employed in different forms, and it effects the removal of the teeth at an angle of about ninety degrees.

In consequence of the great mechanical power which is required, to extract a tooth in this direction, the tooth is frequently broken and the roots are left in the socket: or if the latter are removed with the tooth, a great portion of the alveolar process, and sometimes even one or more of the neighbouring teeth, are broken at the same time. See cases 8 and 36.

Besides this, the fulcrum of the instrument being placed against the gums, considerable pressure upon them and upon the maxillary bones is unavoidable. This pressure not unfrequently bruises, and, indeed, lacerates and destroys important parts; whereby the pain of the operation is greatly augmented, and sometimes considerable inflammation and suppuration are produced, which continue a long time after the tooth has been extracted.

I have known four or five months elapse before the bruised parts had perfectly recovered from the consequences of this painful process, and I have, in my own case, occasionally felt its effects, even after a lapse of three or four years. But even these are not all the injurious effects which may follow this operation thus performed. The most painful inflammation and suppuration of the gums, and absorption of a considerable portion of the alveoli and maxillary bones, and consequent deformity of the face, are not very uncommon consequences of the use of this and like imperfect instruments.

I have seen fistulous abscesses of the upper and under maxillary bones, of the most disagreeable nature, occasioned by the remaining roots. Profuse hemorrhage may occur in consequence of lacerations, accompanying the extraction of teeth with this instrument; see case 36. Cases of this kind, not improbably from the above causes, have, indeed, repeatedly happened in London, and it is well known that some have been followed by the death of the patient. See *Medico-Chirurgical Transactions*, vol. 8, part i. p. 224. Even dangerous diseases of the maxillary antrum may have been the consequence of the use of these instruments. See cases 27 and 33.

CASE XXXIII.

In the spring of 1822, this case of diseased antrum under the care of Dr. Physick, through the kindness of that gentleman, fell under my observation.

A gentleman of about forty years of age, was the subject. He told me that about seven years before, one or two large grinders in the right side of the upper jaw had been extracted with the key instrument, that he had suffered considerably during the operation, which he attributed to a want of skill in the operator.

The gums never healed, and the cheek and jaw-bones gradually enlarged: the two sides of the jaws were at that time about one-third, or one-half of an inch apart, and sufficiently open to admit a finger between them. The cavity was closed by some spongy elongations of the gums from the inner and outer sides. They were cut away, while I was present, by Dr. Physick.

This was done a short time before I left the United States for this country, so that I do not know the termination of this case; but I have every reason to indulge the hope that it has been successful, on account of the timely application of the patient, and of the great skill of the attending surgeon.

Besides all these dangerous consequences, it is worthy of notice that the action of this instrument, being almost entirely mechanical, and but little under the control of the operator, any motion of the patient, or timidity on the part of the dentist, may cause the instrument to slip, whereby, sometimes, a sound instead of a diseased tooth is extracted. A loss, although irreparable to the patient, not much more to be lamented by him than by the disappointed operator, if possessed of proper feeling.

The forceps, in common use at present, are generally so ill-contrived as to be usually applied in cases of no difficulty, and yet the operation is liable, even in such instances, to some of the accidents just mentioned.

The application of this instrument would be far preferable to that of any other, in many cases, were it better constructed for its intended purpose. At present, however, forceps are usually applied only for removing loose teeth.

On the consequences arising from the present imperfect state of the operation

The frequent failure of success in performing the operation of extracting teeth; the many difficulties which have so often opposed its complete success; and the many unpleasant and painful consequences occasionally attendant on its incomplete performance, are the causes of its improper omission, and of the prejudices existing against it.

It is in consequence of these difficulties, also, that physicians and surgeons so often discourage the operation, and that the latter altogether refuse in many cases to perform it, lest their reputation might be injured by attempting it in the usual manner, and with the usual implements. This is the reason that

we so frequently find this operation, so important and useful, yet so delicate when properly, and so dangerous when unskilfully performed, in the hands of inferior men; viz. the bleeders, and barbers, and charlatans of all descriptions, to the great prejudice of the operation itself, and incalculable detriment to society in general.

Although this operation may be often rejected by the general surgeon, from very justifiable motives, yet it is wholly unpardonable in the dentist, to refuse to perform so essential a part of his duty. Yet there are instances of dentists, who, under various pretences, have refused; and who ought to have considered it their first duty to attend to this operation, which may be considered the foundation of a certain success, in the cure of the diseases of the teeth, and of their relative parts.

In fact, to speak more plainly, such a refusal on the part of the dentist can be attributed only to unbecoming and culpable timidity, or downright empiricism. It is, indeed, the general excuse and artifice of timid operators and empirics, who, from inability to perform their duty, shrink from the difficulties, and endeavour to make the duty itself disreputable. One of these philanthropists will represent the tenderness of his feelings, as an obstacle to his performance of so cruel an operation, whilst another will affect to consider it derogatory to the dignity of his rank in the profession, to attend to so insignificant an operation as that of extracting teeth. Fortunately, however, there are few such impostors, and we may venture to leave them with these passing remarks.

There are many, however, of the profession, I am sorry to add, who will rather abandon a difficult case, than make every obstacle a new stimulus for exertion to find out the means of overcoming it, alleging that it is impossible, or unadvisable, or extremely dangerous, to extract teeth under certain circumstances; and it is certainly much less difficult to persuade the patient of the inexpediency of any surgical operation, than to perform it under circumstances of great difficulty. Instead of inducing the sufferer to get rid of an evil which, the longer it remains, becomes the more injurious to him, they take advantage of his timidity or ignorance, and persuade him to endure it; and when, in consequence of the better judgment, or protracted and extreme suffering of the patient, they can no longer avoid the performance of this operation, they will, if any accident occur, resort to such excuses and explanations as are also injurious, alike to the profession and to the patient.

If a tooth is broken they will tell him that it was a fortunate circumstance, because the tooth was united with the maxillary bone, that the roots of the tooth were so irregularly formed as to render their complete extraction impossible; that the gums will

heal over the roots; and that it will never give any more pain, or be productive of any future injury. Such excuses may satisfy and console the disappointed patient, and, therefore, may seem even humane and considerate, but on a little reflection they will be found both mischievous and dishonourable, for whatever is false and injurious, however amiable the deception may appear, is dishonourable.

Not in one case out of five hundred, in which a tooth has been broken, has it been, according to my experience, impossible to extract the remaining stumps or roots, and it is also particularly necessary that such roots should be extracted after an accident of that kind, because of the morbid effects which they would certainly produce upon the general state of the remaining teeth and of the parts connected with them. Should, however, the immediate removal of the roots prove impracticable, which can only be ascertained by the failure of all proper attempts to effect their extraction, the patient, in that case, should be advised to have the remaining roots extracted, after the lapse of a few months; accompanied with a candid remark, that some unexpected or unforeseen formation of the root must have prevented the immediate success of the operation; but that in one or two months, when the inflammation in the surrounding parts will have produced greater disposition to yield to the proper efforts, these stumps or roots may be extracted with facility. This would effectually excuse the operator, without giving to the patient such erroneous notions as must unavoidably mislead him from a proper attention to the health of his teeth.

As to a perfect union between a tooth and its socket, I cannot forbear saying, that I think it utterly impossible when we consider the nature of the parts. The construction of the bony substance of the root and of that of the alveolus are so different from each other, as to render the supposition of their union by ankylosis wholly inadmissible; and as, moreover the intervening periosteum is indispensably requisite for their mutual connection, its destruction by mechanical power or disease must destroy that connection, the tooth consequently becomes loose, and is extracted with great ease. In some very robust constitutions, and particularly in such cases about the age of forty, the periosteum, which holds the tooth in its socket, is sometimes so firmly attached to both parts as to create very great difficulty in the extraction of the tooth to him who is not well acquainted, either with the nature of the case, or with the means of encountering such difficulties. But this obstacle is easily overcome by a dentist of adequate skill and judgment.

As to the alleged irregularities in the formation of the roots of the teeth, I must allow that they certainly very frequently obstruct the operation: and while I am willing to confess that in many

cases the teeth could not have been extracted in the usual manner, and by the usual apparatus, I have not met with a single instance, in which, by a sufficient exertion on the part of the dentist, such difficulties could not be conquered. But as such irregularities frequently occur, the dentist should be in all respects prepared to treat them in all their forms, and by adopting this rule, the fact will be proved that the dentist, who is fully provided with all the necessary instruments of his art, and has proper judgment and skill for his various duties, will never meet with insurmountable obstacles to this operation.

Sometimes from the irritation produced by the edges of a broken tooth, or when broke somewhat deeply, from the irritation of the alveolar process, an inflammation of the surrounding gums takes place which produces an elongation or excrescence of them. This, from the natural disposition of the gums to contract, will, for a time, cover the roots in their diseased state; and, hence, the vulgar notion that the gums will heal over a broken tooth. But it must be well known to every surgeon, that this effect of a diseased state will last only so long as no change takes place in the parts by the suppuration, which sooner or later inevitably follows. Such roots or teeth, are neither more or less than dead parts, covered with what is vulgarly called proud flesh; and are constant causes of diseased action in the surrounding parts, and although, from being deprived of vitality, in themselves no longer susceptible of pain, yet they always act as direct causes of pain and disease in the parts in contact with them, which can never be cured without a removal of this cause of irritation.

From the above facts, it must be evident that the patient is subjected to very injurious consequences when he is discouraged from having such roots extracted, either by appealing to his fears by a representation of danger; or to his hopes by flattering him with the probability of its not being necessary. Any of these pernicious counsels will frequently prevent an application for better advice, until the patient is obliged to seek it in consequence of some of the above results; and will often be the reason of his suffering the real causes of those diseases, which almost always result sooner or later from the neglect of the removal of such dead roots, to proceed to a very great extent without detection.

There are some other irregularities of a very surprising nature, if we may believe some authors who have written on this subject. See Eustachius lib. de dentibus, Cap. xxix. *Monro on Osteol.* p. xiv.

They tell us that they have seen two, three, and even four teeth so firmly grown together, as to form one solid piece, and that on attempting to extract one of these teeth so connected, the whole piece has been removed. When we reflect on these phe-

See also, 1, 2, 3

nomena with the least attention, it will soon appear that they are contrary to the natural history of the teeth. We know, for instance, that the teeth are formed at different periods, and that each tooth is planted and secured in its own particular socket; that, first, the crown of the tooth, and then the part constituting the enamel receives its formation; that the formation of both takes place a long time before the tooth protrudes through the gums and socket, and, also, in such a situation and under such circumstances as to render it quite impossible that any such union could take place during the time the teeth are concealed in the alveoli and gums: and when we consider the construction of the enamel itself, which entirely prevents its union with the neighbouring teeth after it has passed the gums, we have great reason to doubt the existence of examples of such *lusus naturæ*.

For my own part, I must declare, that during all my practice for many years, I have never been able either to obtain ocular demonstration of such a case, or to satisfy myself that there ever has been such a case. And this I say, also, of all my professional brethren with whom I have had an opportunity to converse on the subject. I hope, therefore, that my scepticism on this point will not be construed into a want of becoming respect for the authorities from which these cases are derived. There is no other way for accounting for such doctrine than by attributing it to a weak credulity, or love of the marvellous, or a desire to impose upon the world. Let us take into consideration one of these cases. Mr. Joseph Fox mentions an instance of this supposed union in two central incisors of the under jaw at their contiguous sides. See his *Nat. Hist. of the teeth*, &c. plate viii. fig. 8.

On a superficial view, the upper and under central incisors, as they are the only adjoining teeth in each jaw which keep pace with each other during the whole process of their formation, would seem to be the best adapted for such union and most liable to such irregularity. But on close consideration, great doubts of the facts will arise, if we call to mind the existence and nature of the symphysis between these teeth, by which the jaw is not united until sometime after birth, and consequently, not until those temporary teeth are perfectly formed, and the crowns of the permanent incisors much advanced in growth; and also when we consider that these teeth are divided by twice as much bony material as any of the other teeth, having each of them a separate socket which surrounds them on that side where the two sides of the jaw are united by the symphysis, and where they are the nearest to each other. The author gives no further account of this case, which I consider the most extraordinary of all the cases of irregularity related by him, and, therefore, most particularly worthy of attention. I, indeed, believe that Mr. Fox did not see himself the case he thus

describes ; else he would assuredly have given a more circumstantial account of it.

Such cases furnish a fine apology to ignorant operators, and I have no doubt that the first case of this kind originated in some bungling accident or ingenious deception.

At the time when the formidable pelican, of which I have already spoken, was in more common use than it is at present, it may have sometimes happened that, instead of one tooth being extracted, two, three and four teeth were broken away by the violent application of that instrument. After the occurrence of such an accident the operator, having his reputation at stake, could not readily imagine a more plausible apology for his misconduct than that the teeth had grown together too intimately to be separated. In confirmation of this, he could exhibit to the patient, at the moment of his extreme agony and mortification, the teeth which he had broken out, and which at the time might certainly be united by a portion of the alveolar process, and appear to the poor patient at such a moment as one solid piece of bone. An excuse could easily be given for the non-production of the phenomenon, if it should be afterwards desired by the patient, as its loss or destruction by some pretended experimental process, &c.

Operators become, also, sometimes authors, and, in justice to their reputation, feel themselves bound to give a circumstantial account of all such cases, and these being naturally multiplied by the ignorance of other operators, become like legends and traditions on the monstrous productions of nature, wholly incapable of being refuted, not on account of their actual claims to credit, but on account of the number of believers in them. The story would thus become generally known and recorded, and would be cited in excuse for every subsequent disaster by other incompetent dentists.

I have always considered all such assertions as utterly false and contrary to good moral and professional principles, and during my long practice in the United States of America, where diseases of the teeth more frequently occur, and are more rapid in their progress than in any country of Europe, and where it might consequently be supposed that such cases would more probably exist, I have never met with a single case which could support, in the slightest degree, any such erroneous assertions ; nor have I ever seen a tooth which could not be extracted by means of one or other of the instruments, which I have in my possession : and I have frequently removed teeth, the extraction of which had been declared impracticable by other dentists from some difficulties which appeared to them insurmountable, either at the first examination, or after repeated unsuccessful attempts to perform the operation.

It is a fact, therefore, proved, indeed, beyond any doubt, that the difficulties of the operation have rendered it so unpleasant to surgeons and even to dentists, not only to have frustrated every attempt to improve the implements for its performance, but to have placed it in the hands of persons totally destitute of the judgment required to determine on its expediency, and of sufficient skill for its proper performance. Hence arises the imperfect state of this important operation, its unskilful application, the dread and horror with which it is regarded by those who are in need of its remedial effects, and the appalling and dangerous accidents which attend and follow it.

Of these accidents the foregoing description is but an imperfect sketch, and in order to give the reader a more comprehensive view of them, I must refer him to the essay of *M. J. R. Duval*, a very learned dentist of Paris, entitled "*Des Accidents de l'Extraction des dens*;" where he has extensively treated of this subject, and has taken great pains to accumulate cases of difficult and unsuccessful operations and accidents accompanying them, which either have, or are said to have taken place from the time of Hippocrates and Celsus to the present century.

These failures and accidents he conceives to be the result of causes, widely different from those to which I have attributed them; and he endeavours to prove that all the dreadful and appalling accidents which follow the operation, are, almost invariably, unavoidable consequences of this formidable remedy.

Amongst many others, he enumerates broken jaws, loosened teeth, teeth violently forced into the jaw, the extraction of sound instead of the painful teeth, and in children the permanent instead of the temporary teeth, dangerous diseases of the maxillary cavities, wounded cheeks, and lacerated tongues. Even these are not the worst, he adds to them, not only the aggravation of all the diseases of the gums and sockets already existing, but also the production of *tic dolooureux*, abortion, the interruption of periodical evacuations, dangerous and destructive diseases of the eyes, and even death, as not unfrequent consequences of this dreadful operation.

Having thus attempted to intimidate his patients and readers, our eloquent author concludes with advising, in a very sentimental and impressive manner; that they should endure every degree of torture, rather than suffer the extraction of a tooth; and that this terrible measure should be adopted only as the last resource, when the pain has at length produced utter despair, and entirely banished the sufferer's fortitude, and when the actual danger has become greater than the excessive hazard, as imagined by the author, attendant on the operation.

It is then, and then only, that in conformity with the opinion of Hippocrates, he considers the extraction of the tooth advisable.

The instrument to which he seems most favourably disposed, and which he would recommend, is of lead, such as was kept, according to a statement of Erasistratus, in the temple of Apollo at Delphi. Indeed the particular fondness of the learned author for the ancients, seems to have especially guided him in the choice of his theories and arguments, and, doubtless, were *his* system adopted, the art of the dentist would retrograde to *that perfection* in which it flourished between two and three thousand years ago, at Athens and Rome, and prodigious improvements might, doubtless, be expected from so scientific a return to those olden and golden times.

It must certainly be allowed, that M. Duval deserves great credit for the patience he has exercised in collecting so large a number of facts, so well calculated by his ingenious and eloquent representation to enable the ignorant operator to intimidate his patients, and offer ample excuses for any blunders, and the grossest violations of the best principles of surgery and humanity.

Although he is a most industrious compiler and quoter, he has, by his dexterous and invaluable arguments and doctrines, secured himself against both the want of due reverence on the part of the great number of quacks, and the neglect of dental authors, and thus defended himself also against the application of the French proverb, "Ceux qui citent sans cesse, ne seront jamais cites."

Moreover, if M. Duval has been extensive in his practice, and popular as an author, and lecturer in Paris, he has, also, succeeded to admiration in producing and augmenting that excessive dread of the operation, particularly characterising not only his own countrymen, but even the people of the neighbouring continental nations, who are frequently supplied with dentists from the French metropolis: a dread which is not only seen in timid children and delicate females, but which, not unfrequently, disarms the most courageous sons of Mars and Neptune.

Such, indeed is the fact, and it is not less true than surprising that this almost insurmountable fear of the operation of extracting a tooth should have become so common amongst the French; a nation, certainly not deserving of the stigma of cowardice; but, on the contrary, highly distinguished for its valour and fortitude; and nothing can furnish a more convincing proof, not only of the great extent of the persuasive talents and influence of our author, but also of the baneful and destructive power of false prejudices, over even the strongest of human minds.

But it must also be added, that by the propagation of doctrines so exceedingly pernicious, not only great apprehensions have been excited, productive of much difficulty and anxiety both to the dentist and to the patient, but also not a small portion of human misery and distress have been diffused throughout a considerable part of Europe.

OF THE AUTHOR'S METHOD OF EXTRACTING TEETH AND ROOTS.

Practical remarks on the operation.

Having endeavoured to show, and I hope satisfactorily, the great importance of the operation of extracting teeth, by pointing out the various cases in which it relieves the most painful and dangerous diseases, and its great curative effects; not only upon the teeth, but upon the system in general; and having also placed the present imperfect state of this operation in a fair view before the reader, exhibiting to him some of the many injurious effects of its neglect or malperformance, it remains for me now to detail some of the remedies and improvements of my own practice.

The success of almost every surgical operation is, in a very great measure, dependant upon the judgment and skill with which it is performed, and thus the health or life of a human being may be sometimes preserved by an operation skilfully performed, which, if rudely or unskilfully managed, might lead to a greater destruction of health, or even a premature death.

The superiority of a surgeon, is chiefly founded on a better acquaintance with the diseases, which indicate, and with the parts, which are the subject of operations; and upon that manual dexterity, which is a rare gift of nature, and, though capable indeed of great improvement by experience and practice, can but rarely be acquired by labour, or any exertion. This fact may be applied particularly to the operation of extracting teeth. Simple as this operation really is, and although it is in many instances performed with much facility, it is, not unfrequently, opposed by almost insurmountable difficulties. Under such difficulties which often occur quite unexpectedly, the above qualities in the operator are unavoidably requisite.

A few anatomical and pathological remarks, which are immediately subservient to this operation, will not, I hope, be deemed here either useless or out of place.

The teeth are all, more or less, subject to the varieties of formation and size, which, although too numerous to be mentioned here, should be familiarly known to the dental surgeon.

The temporary teeth of the child, as well as those of the permanent set of the adult, differ, more or less, either as to formation or situation, in every individual, so that we cannot expect to meet with two sets of teeth precisely similar.

At the age of about six or seven, the healthy child, which has not lost any of the first teeth, possesses forty-eight teeth in its mouth; twenty of them, the temporary teeth, being completely formed and having passed through the gums; and twenty-eight, the whole permanent set, with the exception of the four third

large grinders or wisdom teeth, more or less advanced in their formation, either in the sockets beneath the temporary set of teeth, or about to protrude through the gums.

The incisors and cuspidati have but one root. - The bicuspidati have either one or two roots. The large grinders of the under jaw, have generally two roots, which are short and thick: those of the upper jaw, have most frequently three fangs, which are longer and thinner than those of the under, and are often found to have grown in various and inconvenient directions.

The teeth are held by their roots or fangs in the alveoli, which are cavities particularly suited for their reception.

The roots are firmly attached to these sockets by a lining membrane, called the periosteum, constructed of a number of small but very strong fibres, that occupy the intermediate space between the inner surfaces of the sockets, and the roots of the teeth.

The periosteum is partly elastic, in consequence of which there is a small degree of articulation in every tooth. This varies, however, considerably, according to circumstances; such as, the greater or less length and number of the roots of the tooth; the age and constitutional strength of the individual; and the healthy or diseased state of the parts.

The external part of the alveoli is considerably thinner and much more elastic than the internal processes.

The upper jaw and sockets are of a more spongy and vascular structure than the under, which are consequently of a much denser texture than the upper.

Every tooth, both of the temporary and permanent set, has its individual socket, periosteum, and gums; and as these parts are intended solely for the support of the teeth, it follows that, if they are destroyed by disease, or by any other cause, the teeth dependent upon them must drop out. When the teeth are perfectly removed, these parts, being no longer requisite, are gradually removed by the natural process of absorption.

If, however, any roots or portions of roots are left in their sockets, this process is counteracted, and they produce, by their chemical and mechanical irritation, such inflammation and suppuration, as become sometimes, by their long continuance, very dangerous and destructive, not only to these parts themselves and to the teeth, but also to the general system.

The variety of the causes and kinds of diseases, the different forms, extent, and situation of the caries, the great difference in the size, formation, and muscular construction of the mouth and other parts, subsidiary to the functions and health of the teeth in different persons, are all circumstances worthy of mature consideration by the operator before he proceeds to operate.

A perfect acquaintance with the sensibility of the different parts is also very requisite, and will be a useful guide to the operator at the different stages of the operation. This knowledge will enable the dentist, when the pain is trifling, to proceed slowly and carefully; and, as soon as it is becoming acute, to complete the process as soon as possible, and thereby prevent unnecessary pain.

It is well known that the nerve of the tooth is exceedingly sensible, and that when in a state of inflammation, it is subject to the most acute pain. This painful symptom, the tooth-ache, is so generally known as to need no further description.

The periosteum, however, in a healthy state, I have always regarded as having but very little sensibility, from the circumstance of its being intended by nature to endure so great a pressure as it undergoes in masticating very hard and large substances.

Having had occasion to extract some of my own teeth, I have had the best opportunity of experiencing all the effects of the operation upon the patient, under all its circumstances and periods; and although my principal motive in having recourse to the process was the desire of getting rid of some troublesome teeth, yet I made it a matter of particular attention, as an opportunity for acquiring personal and experimental information on this point.

The teeth which I extracted from my own mouth were seven in number: six upper, and one under, large grinders. They were all very firmly seated in their sockets, and the upper had each of them three, and the under two roots. In the upper teeth, with the exception of one only, the caries had just reached the nerve, and the under was perfectly sound; so that in six of them no considerable inflammation existed, either in the nerve or in any of the surrounding parts.

The extraction of all the upper teeth was performed with the forceps, and very slowly, that I might be able to feel, and remember distinctly, the peculiar kind of pain attending each part of the operation in all its degrees. When I took hold of the tooth with the instrument, I felt no pain whatever; in moving the tooth towards the outer side of the mouth, it seemed to me that I could hear the gradual tearing of the periosteum on the inner side, and feel the crushing of it on the opposite side of the roots. This process was accompanied with little or no pain; but when the periosteum was perfectly separated and the different nervous cords were being torn off, I felt an acute pain of momentary duration, very similar to what I had experienced the evening before from the tooth-ache for at least an hour; and which was the cause of my extracting the tooth; I believe it was equally great,

but certainly not greater, and it was instantly over. The circumstances accompanying these operations, which were performed within a period of ten years, were so much alike that the above account will serve for all.

The removal of the second large grinder from the left side of the under jaw was performed on the 9th of July, 1824, by the instrument newly invented by Dr. Physick. The tooth was removed towards the posterior part of the mouth; and, when loosened, was extracted from the socket by means of the forceps. The pain was not greater than that which I had experienced in the extraction of any of the upper teeth, although the tooth was very firmly held in its socket.

The extraction of the first large grinder on the right side of the upper jaw, was performed on the 7th of January, 1825. The lining membrane having been previously inflamed, and suppuration having commenced, the pain was somewhat more acute than what I experienced in the removal of the other teeth, yet it was much more supportable than the tooth-ache.

Many of my patients, who have not been deceived by unnecessary apprehension and fear, have given me a similar description of their feelings at the time of the operation.

From my own experience, in connection with the above facts, I am induced to believe that the periosteum, in a healthy state, has little or no sensibility, and that the tearing of the nervous cords of the roots, while the tooth is alive and free from inflammation, is the greatest, if not the only cause of pain in the operation, and that the pain is generally of momentary duration only.

When the periosteum is in a diseased state, it is more sensible, and sometimes painful, and will generally be found relaxed and weak, and the tooth itself loose.

When either the nerve or periosteum is in a state of active inflammation, the pain of extraction is somewhat augmented; but the suffering of the patient from the tooth-ache is also so much greater as to determine him to submit to the operation, even more readily than in other cases.

When the tooth has lost its vitality by the destruction of the nerve the periosteum begins to decay; so that, after a time, the tooth is held only by the mechanical adhesion of this membrane to the roots, and by the contraction of the alveolar processes. When the tooth is in this state, no great sensibility can exist in the periosteum, and no pain can be felt in the alveolar process; so that the dead tooth or root might be extracted almost entirely without pain, if the alveoli and gums and contiguous parts were not more or less symptomatically diseased by the irritation of the dead tooth or parts of the tooth.

A minute knowledge and a quick conception of the above cir-

cumstances will enable the surgeon-dentist to decide at once on the mode to be adopted, and on the means requisite for proceeding in every necessary operation.

Of the performance of the operation of Extracting Teeth.

The removal of a tooth is effected by separating the periosteum from the alveolus, and by tearing off or dividing the nerve and its cords. To obtain this object with the greatest safety and least pain and injury to the patient, I have adopted the following principles and mode for the operation.

Every tooth or root is to be removed in a direction towards the outside of the mouth, if no particular circumstance exists to form an exception to this rule.

The tooth which is free from acute inflammation and pain, should be removed, first by a slow movement of it towards the outside of the mouth, just sufficient to separate the periosteum on the inner, and destroy it on the outer side of the tooth, and then by one quick firm traction, in a nearly perpendicular direction, to divide the nerve cord or cords. The whole time of the operation should be from two to four seconds.

When either the lining membrane of the tooth, or the periosteum, or both of them, are inflamed and painful, the periosteum and alveolar processes are generally more or less relaxed. Under such circumstances, it is advisable to perform the operation more speedily, and to do this effectually without inflicting any unnecessary pain, a very firm hold should be taken of the tooth, and by a slight lateral motion it should be extracted in the manner I have just described; the time employed should be from one to two seconds.

In the extracting of roots or stumps of teeth, as the life of their nerve and periosteum must in general be supposed to be extinct, there can be no sensibility in these parts; and the pain, if any, attending their removal, will be owing to the diseased or irritated state of those parts of the periosteum which belong to the sockets surrounding them. To occasion as little pain as possible, it should be the object of the operator to remove such roots or stumps with the least possible pressure on the surrounding parts. Great care and dexterity are required to secure this object.

If the roots are sufficiently strong, and so formed and situated as to be taken hold of by the instrument in the same manner as the tooth, they should always be extracted in the same way as the tooth itself when free from soreness and inflammation; and they may be thus removed almost entirely without either pain or difficulty.

Sometimes, however, these roots or stumps are found in so soft and putrid a state as to crumble away by the mere touch of the

instrument, and at other times so deeply seated within the socket that their existence is only known by the opening in the gums, or by the diseased state of the surrounding parts. In this state they are always very hurtful to the neighbouring teeth and other parts; and I have often found their extraction very difficult, but never impracticable. Their removal can always be accomplished by a division of the surrounding periosteum with some cutting instrument, and the application of a sufficient force afterwards, in the same manner as before directed. See Case 24.

On the other hand, when both the lining membrane and periosteum of the remaining roots or stump yet possess their vitality, as is generally the case for a short period after the accidental breaking of a tooth under the operation of extraction, the removal of the root or roots is sometimes accomplished with much greater difficulty, especially if the firm attachment of the periosteum to the socket is increased by some irregularity of the root or roots, and in these rare instances only, may a delay of the operation be necessary. In three cases only of this kind, during all my practice, have I been obliged to defer the operation for five or eight weeks; when it was accomplished instantaneously, and the hooked form of the roots proved to have been the cause of the difficulty which rendered its immediate completion impossible, but which after the death of the periosteum, ceased to be a sufficient obstruction to their complete extraction.

Of the Physical and Mechanical Means to be used in the performance of this operation.

It is the duty of the surgeon-dentist to be fully prepared for every emergency in this branch of surgery, inasmuch as he has made it his particular study, and professes to practise it exclusively; but especially for all the varieties of this operation, and with every instrument which it may be possible for him to require. It should always be considered as a golden rule, never to be departed from, that every dead tooth and root, and all such teeth as cannot be preserved alive, should be extracted; and that there should be no dissuasion, nor pretext, nor excuse of any kind made use of to avoid the operation. In all such cases, it should be the imperious duty of the dentist to recommend the extraction of all the affected teeth or roots, however unpleasant and difficult it might be to the operator. Actuated by such principles, and a sense of their great practical importance in dentistry, the surgeon-dentist will spare no expense nor time in the extension of its apparatus by any invention or improvements that may occur to him during his practice; for the assertions of those who pretend to remove all sorts of teeth and roots with only one instrument deserve as much credit as those of the impostor who pretends to cure every disease with

one infallible drug. They are both, indeed, instances of the most impudent quackery.

In every surgical operation, the first object should be, to place the patient in a proper situation; which should unite as much as possible, comfort to the patient, and convenience to the operator for the requisite speedy and adroit performance of his duty.

All operations on the head require a particular attention to this point, as it is the most important part, and contains the most delicate and most precious organs of the whole system; while operations on the mouth and teeth, in particular, are, in many cases, extremely tedious and fatiguing to the patient, as well as exhausting to the operator. A proper situation of the body and parts to be operated upon, will not only greatly diminish all these inconveniences to the patient, as well as to the operator, but will render the performance of every operation more certain and successful.

The less mechanical force is used in any surgical operation, the greater the safety with which it is performed. All unnecessary mechanical power should, therefore, be avoided in the performance of this operation; and every tooth or root should be extracted, if possible by physical strength only; in order that the operator might have an entire control over the process of the operation, whatever occurrences might present themselves during its progress. Every instrument used should be formed and constructed so as to bear as little as possible upon any other parts than those of the tooth or root intended to be extracted; and the fulcrum of the lever, as well as the moving power, should be in the hand, and exclusively subject to the will of the operator.

These objects can be obtained only by the possession of a great variety of instruments, each of which is especially adapted for some particular cases.

Of the Operating Chair.

A well-constructed operating chair is a very important part of the apparatus of a dentist.

In the beginning of my practice, I felt the want of such an instrument, and I consulted every author I could meet with, in the professions both of the dentist and of the oculist, for something of assistance in this matter, but without any success. I was therefore obliged, after much trouble and disappointment, to endeavour to invent an operating chair for myself.

This chair is one of the most important improvements which, I hope it will not be deemed presumptuous in me to say, I have made in the apparatus of the profession. It is susceptible of so many changes with great ease and expedition, and without the use of any complicated machinery, that it may be accommodated to the size of any patient, and to every position of the head necessary for

any process, and wholly supersedes the necessity of any services from assistants, which are both very uncertain and unsafe.

In most instances, the more difficult dental operations, which I am enabled to adopt whenever they are indicated, can be performed but very imperfectly, and frequently not at all, without the assistance afforded by this chair. For the extraction of teeth, its advantages are very evident in cases of difficulty. I have never found it necessary to place my patient in any of those unbecoming and inconvenient postures which are sometimes recommended and practised; such as, that of placing the patient upon the floor, or taking the head between the knees, &c.

For the removal of the upper teeth and roots I always make use of a high chair; and for the removal of the under teeth, of a low one, on which I place the patient with his head leaning back and resting against the head piece, placed in the most convenient direction.

Of the Forceps.

All such teeth and fangs as are sufficiently strong to afford a firm hold, I extract with the forceps or pincers: and, for this purpose, it is necessary to have instruments of this kind of different forms, sizes, and strength.

Of the Pyramidal Lever.

The removal of all fangs or stumps, which cannot be extracted by the forceps or pincers, I have invariably succeeded in effecting with the instrument which M. La Forgeue calls "*Le Levier Pyramidal*." This instrument is formed somewhat like a pointed gouge, and is attached to a handle like that of a punch. Its point is sharp in order to separate the periosteum around the tooth, and to lift it out of the socket after it has been loosened.

This instrument should be made of the best steel, so that it may be sufficiently hard to take a fine sharp edge, without being so brittle or hard as to break under the application of any power.

The dentist should be in possession of many kinds of this instrument differing in strength, size, and shape, so as to enable the operator to introduce the cutting point between the socket and tooth, and give a sufficient purchase to use it as a lever in lifting out the tooth or root.

Of the Instrument invented by Dr. Physick.

For removing the dentes sapientiæ and sometimes the second molares, I have occasionally used an instrument invented by Dr. Physick of Philadelphia; of which I beg to give a short description.

This instrument is in the form of a strong pair of tooth forceps: of which the parts which commonly form the claws are two blunt

blades, somewhat in shape like those of a pair of large nail scissors, and in an oblique direction.

The tooth is removed by placing the two blades between the tooth to be extracted and its anterior neighbour, with sufficient pressure to force the tooth towards the posterior part of the mouth, in order to destroy the periosteum; the tooth is then to be lifted out of its socket by the same instrument, or with another pair of forceps.

In these cases where the anterior teeth are sound and firmly seated in the sockets, and when the anterior part of the tooth to be removed is not too much destroyed by decay or caries, I have found this instrument very well adapted for the operation.

Of the Key and the Punch.

I have very seldom used the key and punch. I believe I may justly say, that in the last ten years I have not extracted fifty teeth with either of these instruments, although I have several different kinds in my possession. Nevertheless, in some rare instances, their use may be properly indicated.

Remarks on Instruments for Extracting Teeth in a perpendicular direction.

On a superficial view it might be supposed that the extraction of a tooth would be best performed in a perpendicular direction. The invention of instruments for this purpose has, therefore, been considered a desideratum by some of the most respectable members of the faculty; and some have been at great trouble in making improvements for that purpose. A more particular examination, however, of the subject will show the fallacy of such an opinion, and put a stop to injurious experiments.

By the perpendicular extraction of the tooth, the division of the nerve cords and of every fibre of the periosteum is effected at the same instant, by which all the pain is concentrated into the same moment, and hence is rendered exceedingly intense.

To effect the operation in this manner, the whole physical strength of one man would hardly be sufficient, and it would be requisite to employ a lever of great power, the fulcrum of which would necessarily be placed either upon the neighbouring teeth or upon the gums. The pain produced by this pressure of the fulcrum would be extreme, and felt also at the same instant as that caused by the extraction; so that the tearing of the periosteum, the breaking of the nerve cords, and the contusion of the surrounding parts would excite all at once a pain wholly insupportable, and incalculably greater than that attending the method which I have recommended; besides this, we must take into consideration the many disagreeable and painful consequences which, I may

say, would almost invariably happen to the teeth, periosteum, alveoli, gums and maxillæ, exposed to the mechanical influence of such operations; as the danger and destruction of these parts would be in proportion to the power applied for the removal of the affected teeth.

Indeed, to any one at all acquainted with the anatomy and pathology of the teeth and their gums, the notion of such a method must be an absurdity: whilst new implements made on that principle can only betray the ignorance of their inventors.

I have two instruments of this kind in my possession, one invented by Mr. E. M. Stoltz, of Cassel, and the other by Mr. Simpson, of this country. They are fine specimens of workmanship; but they are too complicated and too bulky for any operation; even though the objections above mentioned were not insuperable. They are, indeed, like Pindar's razors, more calculated for sale than use.

I am aware that any description of a dental apparatus must be exceedingly imperfect without plates; but as it is impossible to give engravings of all my instruments, many of which are entirely new, and others greatly improved, in consequence of the great delay and expense which would necessarily be incurred, it is needless for me to attempt any further description.

The number of my instruments for this operation, is upwards of eighty, of which more than two-thirds are actually indispensable to do any justice to this important remedy. Indeed, my apparatus, in consequence of its extent, and on account of its great difference from what is generally used, would not only be dangerous in the hands of the ignorant, but its judicious application would require some previous practical instruction even on the part of the scientific dentist. This, I hope, will be deemed a sufficient apology for my not giving any further description, at least at present: I hope, however, I may have an opportunity of doing so at some future period.

Of the moral means subservient to the due performance of the Operation of Extracting Teeth.

Having endeavoured to point out the surgical means requisite to enable the dentist to meet all the difficulties which may occur in the performance of this operation, and to perform his duty with the greatest care and safety, I have now to allude to other circumstances which also claim great attention: viz. those of a moral nature, which are often as important as they are perplexing and discouraging.

Of the Impropriety of applying Force.

It is a practice universally adopted in surgery, when an operation is to be performed, to apprize the patient of its necessity, and

to give him an opportunity for a deliberate consideration, in order to decide for or against its performance; or, if the patient be a child, or otherwise incapable of determining for himself, the parents, guardians, or friends are consulted. The same practice may also be adopted by the surgeon dentist.

When the patient has decided on submitting to the operation, the prudent surgeon will take care to provide for, and prevent every possible contingency that may delay or interrupt its performance.

As soon as the surgeon has commenced any operation, the process should be no longer subject to the interference of the friends or patient, who, having acceded to it, the latter must submit to its accomplishment, and, in case of necessity, should be prevented by manual or mechanical assistance, from exerting any voluntary or involuntary impeding or resisting force.

This precaution is of the greatest importance, both for the patient, and the general surgeon; of which, however, the dentist is altogether unable to avail himself. His situation is very different, and much more dependant and precarious. He can use no mechanical means to prevent interruptions offered by his patients, or to hinder their putting a complete stop to these operations before they are completed.

This difficulty places the successful treatment of a case, and not unfrequently the comfort of a patient, and the reputation of the dentist, in a very dubious situation.

When it is required to extract only one tooth, this difficulty may be in a great measure avoided by the method of performing the operation which I have recommended; as, in that case, the patient has not much opportunity to interfere when the tooth has been well taken hold of by the instrument.

When, however, many teeth and roots are to be extracted, as often happens from previous neglect, or bad treatment, and the whole set of teeth is in a situation of great danger, such a difficulty may be occasionally apprehended.

If, in such cases the patients were held, as would only be possible in cases of children, the operation would be rendered an object of more dread than it is at present: and, as on children it must necessarily be repeated at intervals for many years, the terror of it would render the sufferer more miserable at each successive operation, and the operation more insupportable to the patient, and more difficult to the dentist.

Little benefit, however, would be gained from the application of force; for, although the patient's head might be held immovably, yet it would be extremely difficult, if not impossible, to prevent him from shutting his mouth, except by some mechanical means, such as, a gag, or some other powerful instrument, which method

of course should not be adopted, on account of the disagreeable and even dangerous effects which might arise from its application.

But it is a matter of the greatest consideration, that all such means would make the operator rather an object of terror and hatred than of regard and affection to the child, and the dentist who will not endeavour to profit by the disposition in the youthful heart to attach itself to whatever it has need of, will miss a powerful auxiliary, particularly in the application of this surgical remedy: the proper moral means, reasoning and kindness, will do more than force with every human being, but especially with children. Obtain their confidence and affection, and you may do any thing with them that benefits their moral and physical welfare.

Of the impropriety of using deception.

The use of deception, which I am sorry to say is not unfrequently practised by operators on the teeth, is not less objectionable than that of force.

It may be serviceable with children in the first operation, but can never be repeated, and is a great disadvantage in the conduct of succeeding operations.

It prevents that confidence which should encourage the little patient, and enable the surgeon to act freely. It is also very irritating to the self-love and pride of the young individual, which should rather be stimulated by the judicious dentist, and be used as a chief governing power over the apprehensive mind of the child; whilst any humiliation of that feeling should be avoided, as it will never fail to produce a degree of resentment in the tender heart, however adroitly the deception may have been practised. It deprives the patient of every opportunity for gaining credit for the display of courage and fortitude, and is especially mortifying to those who are solicitous of distinction for courage, as generous-minded children always are.

I have frequently found that I could entrust such becoming pride with much more confidence than any kind of deception, especially with children, and weak and faint-hearted people.

In short, the dentist should at all times disdain to use any deception or force, and should consider either as wholly unworthy of an intelligent surgeon, as well as injurious to the patient; as neither will ever inspire the latter with the necessary steady and composed resignation, which must be founded on unlimited confidence, and obtained by upright conduct only.

I do not wish, however, to be understood, that parents should not exert their authority at a time when the future health of their children is the object of serious consideration. Indeed, the greatest assistance may be expected from a judicious and positive interference on the part of a sensible parent, relative, or friend;

whilst nothing can be more inconsistent or more unbecoming, and even dangerous, than the expression of fear and false affection by any of the bystanders on these occasions.

By such interference at so critical a moment, I have sometimes seen the best plans for a permanent cure totally frustrated, when this conduct could not fail to become the cause of protracted misery and pain to the child during the whole of its after life.

Sometimes, when the constitution is affected by a number of decayed roots and teeth, and the local and general effects are rapidly proceeding to destroy the remaining useful teeth, and to injure the general health of the patient, the difficulties ensuing from any interruption to the discharge of his duty, must naturally be very disheartening to the humane operator, who feels for the suffering individual the interest necessary to insure success under such difficulties. It is, nevertheless, at this moment that he must reasonably expect to encounter such interruptions and difficulties on the part of delicate and nervous patients, particularly if the patient be a lady or a child. The whole system may be so affected by a long continuance of delicate health, or a high degree of nervous irritability, as to cause the greatest apprehension, and induce the false belief of inability to undergo the operation, however the inclination may favour the intention. The pain of the operation will be considered more, and the power of supporting it less, than it really is.

If, under these circumstances, a considerable number of roots and teeth are to be removed, much ingenuity and judgment are required to enable the operator to proceed without interruption; inasmuch as the most trivial accident may defeat the accomplishment of the operations.

These are, indeed, cases in which the greatest professional skill and the utmost delicacy and gentleness are required, added to an intimate knowledge of the human heart; yet the dental surgeon, possessed of these moral qualifications, will never require the use either of force or of deception, but will obtain, by the influence of his character, the confidence of the most delicate and timid of his patients. See the Cases 10, 12, 13, 14, 16, and 17.

Concluding remarks on the author's method of Extracting Teeth and Roots.

During a practice of many years, I have invariably performed this operation upon the principles, and in the manner here recommended. I need not say, therefore, that I consider it to be the best calculated to prevent every unnecessary pain, and to render what is unavoidably incident to the operation so very supportable, that I have, in almost every instance, succeeded in removing all such teeth and roots, as required to be extracted, at the same

time or sitting, even when the number of such teeth has been considerable.

The pain of the operation is, indeed, so much less from my method of performing it, and the fear of it also so much diminished, that I have often extracted at the same sitting, in a space of time not exceeding fifty minutes, ten to twenty-two teeth and roots from the mouth of the same individual without any such unpleasant consequences as frequently follow the usual mode of performing the operation, even after the extraction of only one tooth. See Cases 9, 10, 12, 13, 14, 15, 16, 17, 18, and 19.

At Philadelphia, in the United States of America, the advantages of this method have been proved in the clearest manner; so that I do not hesitate to say, that the operation in general is there no longer considered as a matter of an alarming nature, even by the most delicate of the well informed members of society, but simply as one of those vexations of life, which are to be met, not with serious preparation, but with a good humoured smile. It is an operation rather sought for than avoided, if necessarily indicated; and when it was judiciously recommended, it was generally submitted to without any hesitation on the part of the patient.

The happy effects it had upon parents and the elder branches of a family were sure to influence the children: from one family they extended to another, and even from one city to another; individuals have consulted me at Philadelphia, who had travelled a distance of from one to thirteen hundred miles, with a view, not merely to submit to this operation, but to ask for advice and assistance, as it related to the other branches of the profession of the dentist. See Cases 14, 15, 17, 18, and 31. This may be said, not only in corroboration of the fact already stated concerning the practice itself, but also particularly to show the inestimable value given to sound and beautiful teeth in the opinion of the well informed classes of Americans.

The multitude of frightful stories concerning the pain of this operation, and of the accidents so frequently resulting from it, were entirely disregarded and forgotten; and children began to consider the regular attendance of the dentist as a necessary part of their physical education: and I have frequently found them more willing to visit the dentist for the purpose of submitting to his professional duty than to study a tedious lesson. In many large families, boarding schools, and other establishments for youth, where I have been the regular attending dentist, I have found this operation so seldom regarded with fear, that it has been no uncommon occurrence to be visited by some of these little children, of the age of from four to nine, to request me in the name of their parents to examine their teeth and remove such as I should think proper. I have known this to occur when the little

creatures were too small to reach the bell or knocker, and were obliged to request some passing person to give the signal for them.

These are affecting instances of youthful confidence, and, simple as they are, they shew, what nothing else would prove so well, with how much indifference the pain attending the extraction of teeth may be regarded even by children, if the mind is not misguided by false prejudices and deceived imaginations. I hope, therefore, these remarks will not be deemed unworthy of a place here: for my own part, I have never considered such facts beneath the dignity of science, in as far as they may be highly useful; and I have always remembered them with particular pleasure, as bearing the most unquestionable testimony of the affectionate consideration of those, who are never to be thought of without emotion, the helpless and the delicate.

They are the strongest proofs of the extreme magnitude of moral sufferings in comparison with those of a physical nature, and how very trifling and supportable, even the greatest bodily pain, especially those of curative operations, might generally be rendered by a proper exertion of the mind, and by a judicious excitement and direction of its energies and powers on the part of the operator, and the friends of the suffering individual.

In illustration of these remarks, I beg to relate one case which occurred to me not long before I left Philadelphia.

CASE XXXIV.

When my determination of revisiting Germany in the spring of 1822, on account of my health, became generally known, I met with so many affecting proofs of confidence from families, and parents, and children, as almost to prevent my departure, I cannot permit myself to say any thing more on the subject in this public way, nor should I mention it at all, were it not a consolation and relief to my own heart, and at the same time I hope, a proof that I was not insensible to such kindnesses. Although the time fixed for my departure was the spring, I was detained by consultations and important cases until the autumn, notwithstanding my eager endeavours to escape from both.

Among other families who came for a final consultation, was the very amiable and numerous one of Mrs. C. to which I had been the attending dentist for several years. The health of this excellent lady was delicate, the nature of her education had not been such as to have prepared her for encountering severe trials; and her situation in life was such as, but for her delicate health, might have been regarded as one of the most enviable on every account among women.

I examined the teeth of all her daughters, and found them all in a healthy state except those of the youngest, who was about ten

years of age, several of whose incisors I discovered on minute examination to be carious, and I proposed to remove the caries with the file, and to extract the four first large grinders, in order to prevent a recurrence of the disease, which had arisen from some irregularity in the teeth, owing to their crowded state.

The poor child was greatly alarmed at this advice. Her eyes filled with tears, although her sisters, who were more familiar with the operation, were whispering to her to be of good cheer. The affectionate mother was much grieved at the discovery, and the struggle between her good sense on the one hand, and her parental anxiety on the other, was so affecting, that I proposed another plan, by which I should be able to save all the teeth of her daughter. But to this proposal she would not consent, declaring that she was convinced my first advice was the best, and adding that she and her daughter would submit to the operation first proposed; desiring only a little time for preparation.

About a week afterwards, the little girl called upon me in excellent spirits; and after expressing her sorrow for not having submitted to the operation immediately, stated that her reluctance had principally resulted from the alarm of her mother, who had continued, ever since I last saw her, to express her wish that the operation should be performed, but had not courage enough to agree to its performance. She, the daughter, therefore, had at last resolved to come to me, without the knowledge of her mother; and having acquainted me with the circumstance, she sat down with sparkling eyes and a smiling countenance, and said, "Now, if you please sir, I am ready."

I shall not attempt to describe my feelings on this occasion: but merely state, that in less than five minutes the four permanent first large grinders, the largest teeth in her mouth, were wrapped up in a piece of paper, and she went away with them in her hand, rather dancing than walking, to surprise and relieve her anxious mother from fear and apprehension.

I leave to parents, and particularly to mothers, to judge of the mother's feelings for so amiable a daughter.

In my circle of practice in Philadelphia, it seemed that reason had entirely overcome the impression of fear; an affection, indeed, which frequently makes imaginary pain appear real; and I deem it my duty, in justice to the American ladies, and particularly to those of Philadelphia, to pay my small tribute of praise to their patience and fortitude, a feature no less beautiful and virtuous in the female character, than true courage is in that of our sex.

The climate of the United States of America being unfavourable to the health and preservation of the teeth, these ornaments of the mouth, when beautiful and sound, are more highly esteemed

there than in any other part of the world, as far as my experience enables me to judge ; and it is but justice to say, that the inhabitants of that country are ready to use every exertion, and submit to the most painful and tedious operations as soon as they are convinced of their efficacy. I have been very rarely unsuccessful in inducing my patients to submit to the extraction of all such teeth as I considered necessary ; at the same time I have seldom met with any continued opposition, even in cases requiring this operation to the greatest extent. Indeed, so entirely have I found all fear of this operation abandoned by ladies, that I have sometimes met with considerable difficulty in persuading them to retain teeth partially affected, and such as I deemed proper to be preserved ; and I have even been obliged peremptorily to refuse their request, when they have desired me to remove teeth under such circumstances.

Having, in the foregoing pages, strongly recommended the operation of extracting teeth in opposition to the practice generally adopted, and against vulgar prejudices, founded on a want of sufficient practical experience, or sinister motives on the part of certain unworthy members of this profession ; I hope it will not be considered that I have any particular predilection for this operation.

From the causes I have exhibited, which so universally produce great dread of the operation, it seems evident, that there is scarcely an operation which, from its frequent necessity and innumerable difficulties, is more disagreeable and vexatious to most patients, and more unpleasant to the feelings of a humane operator than that of extracting teeth ; for which reason, perhaps, no operation is less appreciated, and less calculated to be unnecessarily recommended. No dentist of common sense would ever act more against his own interest and feelings, than in advocating this operation without being convinced of its utility, and of its being his proper duty to perform it.

Had Peter the Great himself been a professional dentist, I am strongly inclined to think that his sanguinary passion for the pastime of extracting teeth would have been soon extinct ; for he would have found little gratification in it, except such as was entirely in opposition to what was most acceptable to that cruel monarch ; but which the humane operator cannot fail to enjoy, when he has fulfilled a disagreeable and painful duty for the lasting felicity of others, sometimes not without the sacrifice of his own more obvious and immediate interest.

I wish it to be distinctly understood, that no member of my profession, I am convinced, can have a greater regard for the real interest of his fellow creatures, and no one can consider the loss of teeth as a more serious deprivation, than myself. I have

always considered it the moral duty of the honest and enlightened dentist, to feel as much concerned and interested for his patient, when performing this duty, as the surgeon, when called upon to amputate an important limb. Nothing but the object of preserving health and life can justify the proceeding either of the surgeon or the dentist.

But the best results are rarely obtained by pleasant means; and they never can be obtained in dental surgery by such remedies as are in vogue at present. As different as my practical principles are from those commonly adopted, so much I am convinced are they promotive of the permanent interest of the patient, and satisfactory to the feelings of the conscientious dentist.

Whenever the operation of extracting teeth is performed on the principles, and in the manner I have stated, it is one of the principal means in the hands of the surgeon dentist of effecting a permanent cure of the diseases, and of preserving the health of the remaining teeth, as well as all the parts connected with them, and thereby to prevent the necessity of a repetition of this remedy.

This operation would, indeed, be rendered almost entirely unnecessary in the adult, if it was always performed when properly indicated in conjunction with other measures, proper to be observed in the treatment of the diseases of the teeth of children, preparatory to, and during the period of their shedding them.

The ignorant mechanical operator would, in this case, be obliged to resort to some occupation more fitted to his capacity, and more useful to society; and his artificial teeth, now so frequently rendered the greatest cause of destruction and disease, would be no longer in request; and thus one of the most powerful causes of the maladies of teeth would be altogether avoided.

Such an expectation, however, I fear we dare not indulge at present, and we must, with christian forbearance, only pray for such persons in the mild language of Christ himself: "Father forgive them, for they know not what they do."—Luke xxiii. 34.

CHAPTER V.

OF THE TREATMENT TO BE OBSERVED AFTER EXTRACTING TEETH, AND
OF THE ACCIDENTS INCIDENT TO THE OPERATION.

THE after treatment of this operation, when judiciously performed, is generally of a very simple nature.

The cases of accidental injury, however accompanying or following its improper performance, are both very numerous and various. Some of them have been stated in the foregoing chapter; but to give a full view of all these distressing consequences, would far

exceed the limits of this essay. Their treatment must be agreeable to general surgical principles, according to the nature of every particular case. The present chapter however, will admit of only a few general remarks on the subject.

Of the after treatment.

It has always seemed to me, that in the treatment of all fresh wounds, every debilitating cause must directly interfere with that process of nature, by which health is gradually restored to the wounded parts, and that the application of any powerful excitement must be injurious and destructive; and my experience has convinced me of the truth of this fact.

The common practice of applying cold water, or water and vinegar, or any other more astringent fluids, as well as brandy and water, or other more stimulant lotions, immediately after this operation to the wounded parts, I have observed to be almost invariably productive of injuries; such as inflammation, swelling; sudden mortification of some parts of the gums, and sometimes hæmorrhage; and these generally accompanied with much pain; whereas, by the most simple treatment, such effects have been almost invariably prevented.

Fully convinced of the above principles, I have made use of warm water alone, and of such a temperature as would produce no painful sensation upon the wounded parts; and, in most instances, the only future treatment requisite has been as much attention as possible to the cleanliness of the mouth.

If, however, a great number of teeth and roots have been extracted, or the previous diseased state of the parts has been such as to require more active treatment; some slight astringent or stimulant lotions may be used with advantage on the day after the operation, and continued for sometime afterwards with a view to assist absorption, and to promote the recovery of the wounded parts; but it should be always used warm and of very moderate strength; for the application of cold fluids, as well as of powerful stimulants, will always prove injurious, and more especially if tartar or any thing else should obstruct the progress of the absorption of the of the gums and aveoli.

The use of warm water, I believe, has been adopted in amputation and other surgical operations, by some of my medical friends in Philadelphia, amongst whom I may mention Dr. G. M'Clellan, who has assured me of the salutary effect of its application during the performance of these operations, and of its great efficacy in lessening the pain and danger.

Of the treatment or fracture of the tooth.

The fraction of the tooth during its extraction is very frequently owing to an unskilful performance of the operation; sometimes,

however, it cannot be prevented by every possible care and skill. In cases of this kind, it is only necessary to remove immediately the remaining stump or roots in the manner stated, and no other other unpleasant consequences than a momentary prolongation of the operation will be the result of such an accident.

The dentist well acquainted with this operation, and prepared for its performance, will hardly ever fail to accomplish this object; and he should never allow himself to be prevented, nor desist until every exertion in his power shall have proved fruitless towards its attainment.

Should, however, the immediate removal be impracticable, which can only be ascertained after every means for its accomplishment shall have been employed, the operation may be delayed for five or eight weeks, when the surrounding parts will become more relaxed, and the removal of the stumps or roots may be accomplished with facility.

This difficulty is, however, very uncommon. During a practice of fifteen years, as has already been stated, I remember only three cases in which I found it requisite to propose such a delay; and in these few instances it was always proved by the ultimate removal of the remaining parts of the tooth, that some considerable deformity of the root or roots had rendered their extraction impossible at the former period.

Of the treatment of Fracture of the Sockets and Maxillary bone.

By extracting teeth in the manner I have described in a previous part of this essay, it will very rarely happen that any injury is done either to the socket or to the surrounding parts of the tooth extracted; sometimes, however, a small portion of the socket may be withdrawn in adhesion with the tooth, but this accident is attended with no injurious consequences whatever, and is even seldom distinguished by the patient. It requires no other treatment than the removal of the sharp or irregular corners of the remaining part of the socket, in order to prevent their irritative effect on the gums, and to facilitate the absorption of the remaining parts of the socket.

When, in consequence of the application of improper instruments, or from their mal-application, or from any other cause, considerable parts of the socket and jaw-bone should be removed, the same treatment should also be observed, only with the additional use of a stimulant lotion, mixed with some mucilaginous substance.

Of the mistake of extracting the sound instead of the diseased tooth, or a permanent instead of a temporary tooth.

Nothing can excuse the mistake, sometimes committed by unskilful and timid operators, of extracting an useful instead of a

diseased or painful tooth, or of any tooth the extraction of which is not indicated. This can arise only from a total want of qualification for the performance of the operation.

When it does occur, however, the operator cannot do less than acknowledge his mistake, and immediately endeavour to extract the painful or right tooth also. Nothing will more augment the evil of the first error, than the attempt to remedy it, by one far more dangerous and pernicious, namely, the replacement of the extracted sound tooth, which is not an uncommon practice adopted after such an accident.

Although it sometimes happens that a reinserted tooth, after much pain and trouble, becomes reunited with the periosteum, and thus mechanically retained in the socket, yet the nerve-cord of the lining membrane never unites, and the tooth, being consequently deprived of its vitality, must produce very great irritation.

In every instance in which I have seen this practice adopted, the replaced tooth always produced almost the same morbid effects upon the other teeth, and, indeed, upon the system generally, as is produced by the operation of transplanting teeth, such as, a general diseased state of all the other teeth and their relative parts; and, at length, a gradual destruction of the teeth, and of much of the substance in the neighbourhood of the reinserted tooth, as well as very great nervous irritability, and general delicate health.

The morbid effects of such a tooth are so great, that it is not uncommon, from the much more rapid progress of all the diseases of the mouth, to see almost every other tooth destroyed by caries before the chemical powers could remove the reinserted dead tooth by corrosion: hence the very common event of such a tooth remaining longer than the rest; a fact which frequently deceives the superficial observer. I have seen several cases of this kind during my practice, and, in all of them, the effects were more or less similar to the following Cases, No. 35 and 36.

CASE XXXV.

Miss S. of Reading, Pennsylvania, about sixteen years of age, was at one of the first boarding schools in Philadelphia. She consulted me on January 15th, 1814, and informed me that about three years previously, she had the right upper first bicuspid extracted by mistake. It was replaced, and it apparently adhered firmly to the socket. In consequence of the irritation produced by this tooth, one half of her teeth had been already either extracted, or destroyed by caries, the remainder were more or less in a state of decay, and her breath had the most repugnant smell imaginable, being precisely like that of a putrid corpse.

I extracted the reinserted tooth, which was in a very putrid

state, and seven other dead roots and teeth, and by these and other necessary means, her mouth and remaining teeth were restored to complete health.

Of the treatment of hæmorrhage from the socket following the extraction of teeth.

This accident is, most frequently, the effect of improper performance, or after management of dental operations; but it may also take place without the occurrence of either of these causes.

Critical bleeding from the socket, after the extraction of a tooth, is produced by a laceration of some arterial branches, of which the orifices have not sufficient muscular power to contract.

The violent and mechanical causes of this accident have already been explained in the foregoing chapter; and to these may be added, a relaxed or diseased state of the gums and sockets, as also irregularity and deformity of these parts, and of the teeth, augmented by delicacy of constitution, or by a scorbutic or plethoric habit of body, which, more or less, predispose the parts to such a hæmorrhage.

These predisposing causes may be much excited by an injudicious management of the operation. The usual practice of applying cold water, or powerful astringents and stimulant lotions, with a view to prevent the natural bleeding, may frequently excite hæmorrhage in cases already predisposed to it; because, although they act as topical astringents or stimulants for a short time, and prevent the bleeding, they seldom fail to produce injurious effects afterwards.

The wounded blood-vessels, being deprived of their natural relief from free bleeding, become enfeebled by over distension, so as gradually to lose the contractile power of their orifices, and thus the adhesive inflammation of the first intention is interrupted and changed into a morbid action, and a critical bleeding from the parts is the consequence.

Taking these causes of hæmorrhage into due consideration, it is evident that the application of lotions, either of a very powerful tonic or stimulant nature, must be highly improper, and that they must greatly augment the danger, not to add that the application of concentrated acids, caustics, or actual cautery, might be as injurious to the general health, and even life of the patient, as they must prove destructive to the affected parts.

In all the cases of hæmorrhage after the extraction of teeth, that have occurred in my own practice, as well as those which I have seen and read of in the practice of others, I should have deemed it contrary to good surgical principles to use any of the above powerful and destructive applications, especially the actual cautery.

In consequence of the almost inaccessible situation of the bleeding vessel, which is generally surrounded by some of the bony structure of the jaw, it is either altogether impossible to apply these means, or the application is attended with immense irritation, and also of destruction of so great a portion of the surrounding parts as greatly to augment the inflammation: and, if even a temporary arrest of the hæmorrhage be effected by the mechanical pressure of the dead parts destroyed by these means, the morbid state will prevent an union of the orifices of the ruptured vessels, and a relapse of the bleeding must necessarily occur, which may ultimately prove fatal to the unfortunate patient.

There are several cases on record and well-known in London, which would prove the inefficacy of such treatment: but, from their fatal termination, delicacy and forbearance prevent me from making any further reference to them.

This accident may be generally prevented by a careful performance of the operation, and by encouraging the natural bleeding, following the extraction of a tooth, by the free use of warm water only; and in cases where a hæmorrhage is apprehended, by the use of the water as warm as the patient can comfortably bear in his mouth.

The surgical means that should be employed, and principally depended on for stopping the bleeding, is mechanical pressure, and I confidently assert that if this simple remedy is judiciously applied, it will never fail to prove perfectly successful; and will not only render the accident harmless, but even in those instances in which it is not occasioned by an improper operation or unnecessary violence, the bleeding will be productive of beneficial effects to the diseased state of the mouth, as well as to the constitution generally.

By a strict adherence to the above simple method of treatment, it has been a very rare occurrence in my practice, to meet with any instances of this kind; indeed, it has never occurred in cases where a considerable number of teeth have been extracted at the same sitting; and, in the few instances in which I have met with it, I have always arrested it without any difficulty, by the above means, at any moment I deemed most proper.

During a period of fifteen years, I have seen but six cases; of these, four only occurred in my own practice, the most important of which I beg to relate.

CASE XXXVI.

Mr. G. a German gentleman in Philadelphia, consulted me, in 1812, about his teeth and gums, which were in a state of general disease, and rapidly decaying. He gave me at the same time the following history of a hæmorrhage from the extraction of two of his teeth, which had greatly endangered his life.

In consequence of tooth-ache, he was induced to request the extraction of the upper second large grinder of the left side. The operation was performed with the key instrument. In consequence of the imperfection of the instrument, and, perhaps, also of its unskilful application, the tooth in question, together with the third large grinder and a considerable portion of the sockets, were taken away at the same time. The pain was excessive, and the hæmorrhage so great as to render the situation of the patient very dangerous.

Dr. Physick was called in, at a time when immediate assistance was of the greatest importance. He immediately inquired for the removed parts, which were given to him in the state in which they were when removed by the instrument. After having cleared them and the wound from coagulated blood, he inserted the tooth and adhering parts into their original places. The bleeding immediately stopped; the patient was fed on spoon victuals and kept very quiet, laying on his back for some weeks, in order to prevent any obstruction to the adhesive inflammation and union of the parts, and to avoid irritation. The gentleman soon recovered; and probably owed the preservation of his life to the prompt assistance of this very eminent surgeon.

I was particularly struck with this expedient, so immediately successful, but was not so perfectly satisfied with its ultimate effects.

By a particular examination of the teeth, I observed that the reunion of the teeth and other replaced parts with the alveoli and gums was imperfect, and that the irritation thereby produced kept the surrounding parts in a state of constant inflammation and supuration. The gums were red and tender, and the reinserted teeth, not having recovered their vitality, were so decayed that nothing but the roots remained.

The teeth on the opposite side were nearly in the same condition, all the other teeth were rapidly decaying, and the parts connected with them much diseased; but what was still worse, the individual, in consequence of the recollection of his original danger and suffering, could not be persuaded to permit the extraction of those stumps and teeth, which were not only the source of the irritation, but also very injurious to his constitutional health. Every plan, therefore, that I proposed for the restoration of health to his teeth and gums was rejected, from his groundless apprehension.

It is a singular fact, that not long after this consultation, a case precisely similar came under my observation; and it is on account of the uncommon similarity of the two cases, as well as on account of the judicious and very sagacious treatment adopted by Dr. Physick, that I have taken the liberty of relating the above.

On the 13th of May, 1813, I was sent for at eleven o'clock at night to see Mr. P. of Philadelphia, whom I found in state of syncope, owing to a profuse hæmorrhage from an alveolar cavity after the operation of extraction. About ten o'clock that morning, in an attempt to extract the upper second large grinder of the left side, both that tooth and the wisdom tooth, with a considerable portion of the sockets and gum of the same side had been removed. The bleeding had been profuse; but it ceased in a few hours until the evening, when the hæmorrhage returned, and became so great as to cause fainting twice before I arrived.

Having ascertained the nature of the cavity, by examination of the parts which had been removed, which were precisely like those described in the above case of Mr. G. I washed the wound with a lock of cotton dipped in warm water, and then inserted a lock which had been dipped in a mixture of five drops of sulphuric acid and a wine-glass full of warm water. I took particular care to press it well into every part of the wound, and to place upon it several other locks until the cavity was filled; and then to apply several cotton compresses between the wound and the under teeth; so as to obtain a pressure by the shutting of the mouth to prevent the passage of any blood. The mouth was kept in this position by a handkerchief bound about the jaws and head.

The hæmorrhage immediately ceased: the patient was put to bed with the head resting upon a high pillow, and particularly desired not to disturb the morbid parts.

July 14th. About twelve hours after the bleeding was stopped, the patient was weak, but otherwise perfectly well. The cotton forming the large compress over the wound was removed, and the patient desired to keep himself quiet.

July 15th. I found the patient perfectly recovered. The cotton came away altogether in the course of the third day; and the absorption of the remaining parts of the sockets, and the healing and cicatrization of the gums took place gradually and in the usual manner.

For many years after this period the patient enjoyed his ordinary health, and all his teeth remained perfectly sound. He never lost another tooth during his life either by extraction or decay.

The uncommon similarity of these cases does not, however, end here. The accident that occurred, as has been seen, was almost precisely the same in each; the patients were also nearly of the same age, about twenty-seven, both of a hectic habit, and delicate constitution, and both also died about eight years after the operation of a slow consumption.

It cannot be supposed that the accidental hæmorrhage could, in the slightest degree, have contributed to their death; yet it is probable that the hectic and debilitated state of the constitution at

the time of the operation, had so much weakened the structure of the bones as to render them more liable to such an accident, and that the muscular energy of the arterial system was more or less impaired by the general state of the health.

On examining the parts, however, that came away in the latter case, which are still in my possession, there was no appearance of disease whatever in the sockets.

CASE XXXVII.

I was consulted by Mr. R. of Philadelphia. His teeth were encrusted with tartar, but perfectly sound.

1814, Aug. 23. Scaling was proposed and immediately performed. In the course of the operation, however, a considerable deformity became evident. The left lateral under incisor was entirely out of the regular line of the teeth, and so much pressed towards the inside of the mouth, that the cuspidatus and left central incisor were in close contact with each other. The pronunciation was affected by this irregularity, and it had become very difficult, if not altogether impossible, to keep the neighbouring teeth clean; so that this part of the mouth in particular was covered with tartar.

In consequence of the accumulation of this matter, and of the strenuous efforts of nature to remove the irregularity and irritation of the tooth, much debility of the surrounding parts ensued, as was evident from the chronic inflammation of the gums, and from the devastation of the alveolar processes and the gums of the neighbouring teeth.

Having expressed my surprise that the tooth had not been removed, the gentleman replied, that in consequence of its effect on his pronunciation, and its interference with his performance on the flute of which he was passionately fond, he had long ago determined to have it removed; and in the course of his extensive travels he had applied to the most eminent dentists of Bordeaux, Paris, St. Petersburg, Hamburg, Berlin, and other places, every one of whom had discouraged his design, and refused to remove the tooth, under the plea of the danger that might result from the operation; and that at last he had begun to regard the evil as incurable.

It was, however, sufficiently evident that the difficulty frequently accompanying the extraction of very irregularly situated teeth, which was particularly apprehended in this case, was the only cause of their refusal.

My counsel, therefore, was very different, and I advised the immediate extraction of the tooth. I found no difficulty in refuting the objections that had been previously made, and soon satisfied the gentlemen of their fallacy. The tooth was removed, without

any immediate accident. A considerable hæmorrhage, however, took place the next day, and, after all the usual means were tried in vain, I was sent for.

Having succeeded so well in the last mentioned case of hæmorrhage, I determined to depend in this instance on mechanical means alone, notwithstanding the irregular and inconvenient situation of the cavity, which rendered it impossible to apply the pressure in the ordinary manner.

To overcome this difficulty, I prepared a plate of gold bent in the form of an inverted V, viz. Δ , sufficiently large to hang over the front teeth and cover the cavity from which the blood was discharged. This cavity was then filled with cotton dipped in warm water and vinegar; compresses of cotton were laid upon it, which, by means of the instrument placed over them and the teeth, were pressed down by the upper jaw. The bleeding instantly ceased; and the next day the patient was perfectly well. In two days the cotton came away, and the parts rapidly recovered.

It is scarcely necessary to observe, that it was quite impossible that the gentlemen who had refused to operate, could have anticipated any danger of hæmorrhage; indeed, it is most probable, that if the tooth had been taken out at an earlier period no hæmorrhage whatever would have occurred, since the muscular powers of the arterial fibres of the parts not being so much impaired at that time, an instantaneous contraction, accompanied with adhesive inflammation of the first intention, would have most probably followed.

Had I myself even foreseen the hæmorrhage it would have made no difference in either my advice or operation, inasmuch as I consider it in no degree dangerous, if timely and judiciously treated.

CASE XXXVIII.

Miss R. a young lady of Virginia, was at one of the most respectable boarding schools in Philadelphia, of about fifteen years of age, and of a full and inflammatory habit; her gums were scorbutic, and many of her teeth in a state of decay. It was determined to extract the four first large grinders, and to restore to perfect health every other tooth.

1815, May 15th. About eleven o'clock, A. M. the upper two grinders were removed. In the evening, about seven o'clock, I was sent for, on account of hæmorrhage from one of the sockets.

Considering, however, that the bleeding would be beneficial to her general health, I interfered only so far as to request the patient to keep herself quiet in bed; to wash her mouth frequently with water as warm as she could pleasantly bear; and to let the bleeding go on until night. I remained with the family till about eleven o'clock in the evening, when I filled the cavity with cotton dipped in warm water and covered it with compresses, keeping

the mouth shut by a bandage. The bleeding immediately stopped, and the patient was able to attend to her studies on the following morning. Dancing alone was prohibited for a few days.

Four days afterwards she came to my house to submit to the next operation; when I extracted the two under first large grinders without any unpleasant consequences; the other necessary operations followed until her mouth was restored to perfect health.

The bleeding, as well as the proper treatment of her teeth, appeared to have had a striking beneficial effect upon her general constitution. Her health became robust; her complexion had changed from that of a dingy erysipelatous appearance of the entire skin, to a beautiful red and white. Her general health, and that of her teeth, were perfectly good, when I heard from her last, which was many years after the treatment.

CHAPTER VI.

OF THE OPERATION OF STOPPING CARIOUS TEETH.

Practical remarks on the operation.

THIS operation is of great antiquity. It was known amongst the ancient Romans; and even Galen and Cælius, amongst the Greeks, treat of it in their writings.

Stopping or plugging teeth is the filling up of cavities, produced either by caries, or by an instrumental removal of the carious matter, with some artificial substance.

By this beautiful and useful operation, teeth which are greatly injured by caries, may be preserved for many years; in most instances, during the remainder of life; and not unfrequently, from ten to twenty teeth may be preserved by this operation, in the same individual. See cases 7, 15, 16, 17, 18, 19, 42, and 44.

The preservation of all useful teeth, capable of preservation, should ever be considered a matter of the greatest importance to the general health, as well as to the health and beauty of the teeth. Whenever, therefore, requested to perform the operation of extraction, the dentist should first satisfy himself of the absolute necessity of such a procedure, as it would be at all times his duty to obviate that painful necessity if possible, and, when unavoidable, it should be a powerful inducement for preventing its future repetition, by applying the various remedies of dental surgery at an early period.

No operation, I believe, is more frequently indicated, and none better calculated to answer this purpose, than that of stopping ca-

rious cavities with metal; and, if performed with proper judgment and skill, none can afford greater satisfaction, both to the patient and the operator.

Although it may appear vain, yet I consider it necessary to state, that there are thousands of individuals who have been benefitted by this operation by my own hands, in different parts of America and Europe; and, considering the great distress which has been thus obviated, and the comfort afforded to so many persons, a great number of whom do highly appreciate the great advantages afforded by it, I cannot refrain from indulging the most sincere feelings of gratification and happiness.

Impressed with these sentiments, I have always deemed it the important duty of the dental surgeon to make himself master of the most beneficial means for restoring to perfect health, and preserving in the best possible manner all such teeth, of which the preservation is in any way practicable, without allowing any interruption from such difficulties as may arise from the situation of the tooth, or the nature of the disease; and, with such principles only, I am convinced that the dentist of skill and integrity, may become a useful member of society, in alleviating human distress; and cannot fail, not only to effect a perfect restoration of local health to almost every mouth placed under his care, but also thereby obtain a great share of the healing art, in preserving and prolonging health and life.

I hope I may be permitted to add, that I have myself scrupulously adhered to these principles for many years. In illustration of their general correctness, I beg to refer the reader to the various cases related in this treatise; in which it will be seen, that perfect health has often been restored to individuals who were suffering from the most extensive and complicated diseases of the mouth; some of which required the most extensive dental treatment, even amounting to sixty-two successive operations, before perfect health and beauty could be restored to the teeth and mouth. See cases 7, 16, 18, and 19.

It is, however, a matter of importance both to the dentist and to the patient, that the great difficulties accompanying this operation, when properly performed, should be known; for, only when performed consistently with just principles, and with great skill, is the operation of stopping teeth to be regarded as one of the most useful in dental surgery, and productive of the greatest and most permanent benefit to the patient; but in the manner in which it usually is performed, and in the few instances in which it is considered practicable and well adapted, it certainly is not very difficult: nor, on the other hand, of any utility, but even the operation itself becomes the means of increasing the disease, and of hastening the destruction of the teeth. I am myself deprived of

ten valuable teeth in consequence of the difficulties and abuses so frequently accompanying this operation. See Case 8, and as another striking proof of this fact, I beg to relate the following instance.

CASE XXXIX.

Miss H. a young lady of great respectability, of London, visited America, and was placed in one of the first boarding schools of Philadelphia. In 1811, I attended to her teeth, but her immediate return to England admitted of only a partial treatment, and but few of her teeth were stopped with gold.

1824, December 13. After my arrival in London, this lady, who was then married, and mother of several children, consulted me again, and bitterly complained of the unsuccessful dental treatment she had received at the hands of some of those, so ridiculously called fashionable dentists of London, stating that she had repeatedly submitted to many and various operations, such as, scaling, filing, cutting, stopping, and extracting teeth, but without any benefit: and she had especially observed the fact, that every tooth, which had been stopped since her departure from Philadelphia, had either been lost or totally destroyed some years after the operation; whilst those which I had stopped fourteen years previously were yet perfectly sound and useful.

By a particular examination, I found her teeth and gums in a state of general disorder, and injured much more by improper treatment than by their natural diseases, but, notwithstanding this, I had the great satisfaction to find those teeth, which I had stopped in Philadelphia, not only perfectly sound, but precisely in the same state in which they were immediately after the operation.

By the removal of such teeth as had become too much injured by disease and improper operations, and by a judicious treatment of the diseases of the remaining teeth and the gums, the mouth of this lady was again rendered perfectly sound, and her constitution, which had considerably suffered from the local diseases, was restored to its previous health and vigour.

Of the present Imperfect state of the operation of Stopping Carious Teeth.

Although the stopping of teeth is one of the most common operations at the present time; yet so little is it understood, and consequently so imperfectly is it performed, that great injury rather than benefit is its most frequent consequence.

During my residence in the United States of America, I had ample opportunities of judging of the state of dental surgery, not only in that country, but also in others, by being frequently consulted by distinguished foreigners from almost all parts of the world; and I have been thereby enabled to observe its progress

towards perfection in every country. In almost every instance where this operation had been performed, that came under my inspection, it had been productive of no benefit, but generally proved destructive of the health of the teeth.

The slight scientific attention that has been paid to this subject is particularly proved by the superficial manner in which English, as well as foreign writers, have treated of it in their works. A detail of a few statements of those authors will sufficiently convince the judicious reader of the truth of this assertion; but, in order to afford a proper idea of the present state of this operation, both as to its theory and practice, it is necessary not only to notice the methods recommended by some of the most eminent writers on dental surgery, but also those generally adopted at present by the profession.

With regard to the former, it will be sufficient to take notice of M. La Forge and Mr. Fox. The manner in which these gentlemen treat the subject fully proves that they were unacquainted with its great advantages, and that they were not capable of overcoming its difficulties. Their sentiments differ in no material point either practical or theoretical. A view of the opinions of Mr. Fox, therefore, may suffice to represent those of both.

The instruments recommended by Fox are nearly the same as those described by M. La Forge in the *Theor. et Prat. de l'art du dentiste*, vol. ii. plate 4.

Considering it impossible, under certain circumstances, to stop the cavity of the tooth, with metal, Mr. Fox gives no directions for the treatment, and M. La Forge recommends the introduction of a gum mastic, which could not fail to enhance and to extend the diseased action already existing.

Mr. Fox, in treating of caries, expresses his opinion in the following manner with regard to the operation of stopping or plugging, "Beneficial as this practice really is, there are some cases in which it cannot be adopted; such are an unfavourable situation of the decay, or its being so superficial as not to afford depth sufficient to retain the gold leaf. When the decay is situated on that side of the tooth which is in opposition to another, so that persons say, the decay is between two teeth, it is always difficult, and frequently impossible, to retain the stopping." See his *Nat. Hist. of the Teeth*, &c. part ii. p. 35.

In speaking of the operation itself he again states the impracticability of its performance in certain cases, as already noticed. See his *Nat. His. &c.* part ii. p. 146. Though I allow it to be sometimes difficult, it is nevertheless by no means impracticable to a skilful and determined operator.

This author also strongly recommends a new invention of stopping teeth in certain places with metal in a state of fusion; a

treatment, certainly much worse than gum mastic, and, as will be evidently seen, quite incompatible with the intention of this remedy, the preservation of the health of the teeth, as will be more particularly stated.

Of the usual Instruments for Stopping Teeth.

The instruments recommended by Mr. Fox and M. La Forge, are such as are usually found in sets, or cases of scaling and stopping instruments, and consist of:—

1. A hook for extracting foreign substances from the cavity.
2. A straight stopper. 3. A curved stopper, for pressing the material into the cavity. 4. A burnisher, to polish the surface of the plug.

An apparatus so limited, is, indeed, in my opinion, insufficient even for cases the most easy and convenient for the application of this operation; and much more so for difficult cases, even though the operator should have a great variety of each kind of these instruments.

When the decay is situated on the grinding or external surface of the tooth, it may sometimes be possible to stop the cavity with metal, by means of these instruments; and it is owing to the facility of performing this operation on those places, that it is oftener performed there, than on any other part.

A careful and judicious preparation of the cavity for the reception of the plug, is the most important and most difficult part of the operation; this is generally either imperfectly performed, or left wholly unattended to.

The success of this operation is impossible, if from any cause, whether neglect in the operator, or from imperfection of the instruments, the cavity be not perfectly cleansed and freed from all foreign and dead matter, and also from every diseased and inflamed part of the bony structure: inasmuch as the least portion of the latter, being left in the tooth, will spread its destructive ravages more rapidly than before.

The effect of such negligent treatment is, invariably, a chronic inflammation of the whole bony structure, which will, sooner or later, extend itself to the lining membrane, and destroy the tooth, though generally without pain, and in much less time than the disease itself.

The second part of the operation, viz. the proper introduction of the metal into the cavity; and upon this principally depend the permanency of the cure, and the ultimate preservation of the tooth, is also, in many cases, very difficult and tedious.

It will frequently happen that the cavity is imperfectly filled, in consequence of want of power in the present instruments to press in the metal sufficiently, and it consequently becomes a means of

injury, by affording a reservoir for the saliva and other foreign matter; which, mixing with the metal, produces new inflammation and caries in the bony structure, and, ultimately, complete destruction of the tooth in a much shorter period than the disease itself, if left alone and undisturbed, would have destroyed it.

When the cavity is situated in such a manner as to require much lateral pressure against the tooth, great caution is requisite, to avoid doing injury by loosening it or by producing inflammation in the periosteum.

I have frequently seen so much suppuration ensue from an injudicious application of pressure, as had the effect of destroying the alveolus and life of the tooth in a short time, and also greatly affect the neighbouring teeth and other parts of the mouth, while the tooth itself was rendered so loose as to become very troublesome, and at last to require extraction.

Great injury may be frequently caused by such unsuccessful operations, even without the knowledge of the patient, until the tooth is wholly destroyed, and the neighbouring parts much affected.

This artificial process of destruction generally takes place very gradually, and without any acute pain, and is, for that reason, very dangerous, as it prevents the patient from applying for advice, and from attending to his teeth himself.

Sometimes, however, very troublesome and painful symptoms, are early consequences of an improper or injudicious performance of this operation, which make the patient conscious of his situation; such as gum-boils, carious abscesses, &c.

Although the causes of the mischievous effects may not be discovered by the patient till a late period, they are always evident to the eye of the experienced dentist.

If the tooth is stopped with gold in a proper manner, it will appear bright and clear, like a perfectly sound tooth. But if the cavity is not thoroughly cleansed before the operation of stopping, the tooth will first assume an opaque appearance, like that of a dead one; and, if the stopping be not well secured, the caries, excited by the operation, will occasion a dark appearance, and the plug will be pushed out, and thus the disease itself will remove the artificial cause.

Should the caries have been deep, and the gold well forced into the cavity, the disease, not having sufficient power to remove the artificial cause of irritation, will directly proceed towards the nerve, and destroy the life of the tooth, which then becomes a foreign body, and liable to the influence of putrefaction only, by which, although it is very slowly wasted away, its morbid influence extends to all the neighbouring teeth, and other parts of the mouth.

Where, however, every particle of caries and foreign matter has been removed, if the gold has not been well pressed into the cavity, a blue circle generally will first appear round the stopping, and will gradually approach nearer the centre, until the plug has lost its bright golden appearance, and acquired a coppery hue, and at the same time the caries, reproduced by the extraneous matter which is mixed with that of the plug, generally eats its way into the lining membrane, and destroys the tooth.

All diseases of the neighbouring parts, the gums, periosteum, alveoli, or maxillary bones, which arise from an injudicious or unskilful performance of this operation, may be immediately detected by the symptoms which I have enumerated here, and in other places.

Of improper Materials used for Stopping Teeth.

Various materials and metals have been proposed for the stopping of the teeth, all of which are more or less objectionable.

Lead, tin, and silver, are frequently employed for this purpose, but they are all destitute of the properties indispensable to success in the performance of the operation. Any of these metals will protect the cavity from caries for a short period only. They will all soon corrode, and then become more injurious than the original disease; and, in every case, will ultimately prove the cause of destruction to the tooth, which might have been preserved by proper treatment.

Although platina is a more suitable metal than any one of those above-mentioned, yet, in consequence of the necessity of amalgamating some other metal with it to render it malleable, it is by this adulteration rendered insufficient for the purpose. It is never accompanied by that cleanly and bright appearance, so desirable for teeth that have been stopped to present; but is productive of a dingy opacity of the tooth's surface, which is apt to mislead the dentist at a future period into an idea of its being again under the influence of caries, and is, therefore, also objectionable.

Even gold, the only proper substance for this operation, as it is often prepared for the dentist, though free from copper, is, not unfrequently, alloyed with silver, which renders it harder and in some measure liable to corrode, and is, therefore, in this state to be rejected.

M. La Forge in his *Theor. et Prat. de l'art du dent.* v. i. p. 194, advocates the use of gum mastic in some instances, for stopping teeth, which is unquestionably one of the most improper materials for this operation.

The mastic, being kept constantly wet with the saliva, can never become solid in the cavity, but in a few days it will corrode and render the tooth tender and soft, and, at last, produce decay.

At the same time it acts very perniciously on the saliva, so as to occasion very bad breath, and greatly to injure the other teeth as well as the general health.

In cases where a more judicious professional assistance than the above cannot be obtained, it would be better for the patient to keep the cavity as clean as possible and free from every foreign matter, than to fill it up with any material of the above kind whatever; even though the lining membrane should be actually exposed: for it will bear the action of the atmospheric air and saliva with less injury than the irritation of the mastic, or any other substance of a corrosive nature.

The mistaken idea that the atmospheric air or the saliva is very hurtful to the dental nerve has led to the adoption of many false notions and practices; as it has, for instance, to the above method of stopping teeth. Of all foreign irritating causes, these are the least destructive; the former is injurious only in an extreme state of the temperature, and the latter when in a diseased state from general disorder, or mixed with some other matter: hence, by the above operation, a much more destructive substance is placed into the cavity of the tooth to keep out much less injurious influences.

In one instance I have seen the nerve of a large grinder quite free from inflammation, though from the appearance of the tooth it had been quite exposed for a year. The health and vitality of the membrane had been preserved by the naturally cleansing power of the saliva which had removed all morbid irritating causes. I have extracted and preserved this tooth as an illustration of the great irritation the nerve may bear, if the tooth is preserved healthy and free from carious matter.

Mr. Fox, however recommends a more pernicious material for plugging teeth than any yet mentioned.

He proceeds thus: "A new method of stopping the teeth has been recommended to me by some chemical gentlemen, which promises to be very successful in all cases where the tooth is not tender and the caries is situated in the centre. The composition for this purpose is made of bismuth, eight parts; lead, five parts; and tin, three parts: a heat of the temperature of boiling water is sufficient to melt it; hence it is called the fusible metal. The cavity of the tooth being wiped quite dry, may be stopped by pouring a drop of this metal into it, when it instantly becomes solid; and in cooling, as it strikes into all the irregularities of the carious part, it is a perfect mode of filling it up." See his *Nat. Hist.* part ii. p. 148.

It is really surprising that a dentist, so well acquainted with the structure of the teeth as Mr. Fox was, should have recommended this injudicious practice; indeed, that any practitioner of ordinary judgment should adopt such a treatment, as, in my opinion it is

evidently in opposition to all sound surgical knowledge, and incompatible with the object of such operation.

The destructive effects of this process are so evident, and consequently the impossibility of any beneficial result so certain, that I should consider it unnecessary to enumerate its pernicious consequences; were it not that the operation is frequently performed in this country on the authority of Fox; and that it is the common practice of other countries, particularly of France.

In the first place, this metallic compound is as liable to corrode as either lead or tin, and possesses all the other noxious chemical qualities of both.

Secondly, it is in accordance with Mr. Fox's own theory, as it must be with that of all just physiologists, that the bony structure of the teeth is of a vascular nature; hence, after the diseased part of a tooth has been cut out of the carious cavity, the new and healthy surface thereby exposed, must be particularly susceptible of external irritation at such a time. The metal, therefore, introduced into this cavity at the temperature of boiling water will not only destroy the vitality of the living fibres, but also the whole surface of the healthy bone, and thereby reproduce some dead bony substance and caries, the very disease intended to be cured by it, which will inevitably destroy the tooth.

Thirdly, the cavity is not very distant from the lining membrane of the tooth, an inflammation will be immediately produced in that membrane by the irritation of the hot metal and the vitality of the tooth must naturally be soon destroyed. Should, however, the nerve recover from the violent irritation, and the tooth appear to go on well, it will be but of short duration, as it will certainly be destroyed in the manner above stated.

This, however, is not all, there is a fourth objection to it, of itself sufficient to prove the impropriety of this operation. The metal being poured into the cavity in its liquid and expanded state will contract as it cools, and consequently, instead of being "a perfect mode of filling it up," as Mr. Fox asserts, it will leave interstices for the reception of foreign matter, which will destroy the tooth more quickly than if the cavity had not been stopped at all.

This unnatural operation was introduced in 1820, at Philadelphia, by a young dentist who had recently arrived there from London. I was consulted in some of his cases not long after the operations had been performed; and I shall here take the liberty of relating one of them.

CASE XL.

A young lady, about twelve years of age, had the first large grinder of the right side of the under jaw stopped by that gentleman in the above manner, some time before I saw her.

She had patiently suffered, at different times, the most excruciating pain for several successive days in the hope of ultimate benefit; but at length it became quite insupportable, and very alarming to her anxious parents. The great agony she endured had repeatedly occasioned fits of convulsions, and many other nervous and rheumatic symptoms, and produced a great change in her personal appearance and constitutional health.

Not long before I was consulted she had experienced a renewal of excessive pain, accompanied with so violent a fit of convulsions as to resemble epilepsy; in consequence of which, the father called on me, with tears of anxiety flowing down his cheeks, and when I arrived at his residence, I found the family in a state of the most poignant grief.

All the pain and anxiety of the patient and her parents were immediately relieved, by the removal of the affected tooth: the nerve which was found to be in a state of active inflammation and suppuration. The tooth was large and beautiful, and might have been preserved during life, and all the painful and alarming symptoms and derangements which were occasioned by the operation, might have been prevented by an early judicious treatment.

Of certain injurious methods of Stopping Teeth.

I recollect some practices of the profession which cannot be too strongly deprecated; and, amongst others, that of using a common drill, turned by a bow and string, for making the cavity in the tooth sufficiently large, and otherwise adapted for the reception and retention of the plug. Without considering the almost entire impossibility of giving that direction to the drill, which the caries has taken, with any degree of certainty, and the frequent consequent destruction of important parts of the bony structure, as well as of the lining membrane; the excessive irritation and pain, produced by the rapid friction of such instrument, is alone sufficient to destroy the vitality of the bony structure of the tooth.

But what is more surprising and repugnant, after the tooth is thus prepared for the reception of the stopping, some operators actually employ a hammer and punch to drive the metal into the cavity of the tooth.

I have seen the most alarming consequences proceed from this barbarous practice, particularly in the case of several ladies who consulted me in Philadelphia. Many of their teeth, especially the incisors, or front teeth and cuspidati, had been plugged in this manner. Some of them had already lost their vitality, and were discoloured when I saw them, and others were so tender, from the violence that had been used, that the least pressure upon them caused exquisite pain. Considerable inflammation in the periosteum and alveoli was apparent also, and was fast extending round

the gums, which were much swelled; and in some parts suppuration was actively at work to effect the removal of the dead tooth.

There is another practice not less improper and absurd than that just mentioned, which, however, is very common, but especially among French dentists. After the removal of the dead matter from the carious cavity, whether perfectly or imperfectly effected, the actual cautery is used, probably with a view to remove the tenderness, produced by improper and violent means employed for the extirpation of caries, or the consequence of symptomatic inflammation in the general bony structure of the tooth.

The effect of such injudicious treatment, is either the reproduction of the very same disease for which the operation of stopping the tooth is instituted, viz. caries, which is thus artificially created by the destruction of the vitality of the bony surface of the cavity, by which the whole tooth is gradually decaying; or an immediate inflammation in the lining membrane in consequence of such violent irritation, by which this membrane and the whole tooth are rapidly destroyed.

When the caries are situated on the inner side of the teeth, or on that side where they approach each other, the operation is, undoubtedly, very difficult; and, according to the opinion of Messrs. Fox and La Forge, though very erroneous, altogether impracticable: for this reason the operation is seldom attempted, although frequently requisite; in those few cases, however, where teeth have been stopped under such difficult circumstances, the operation has been almost invariably so unskillfully performed as to aggravate rather than to remove the disease, and sometimes even to excite a new and not less destructive malady.

In all such instances of malpractice it is a fortunate circumstance for the reputation of the unskillful operator, that to form a just idea of the causes of the disease, requires a very scientific knowledge of the parts, and that the effects of such treatment are generally not apparent to the patient until some time after the operation is performed. It is, however, equally unfortunate that the patient is frequently deceived during life, and that the ignorant operator, instead of being justly exposed to severe reproach, gains credit and applause for doing much more injury to his patient than the disease could possibly occasion without his improper interference.

Of the author's method of Stopping or Plugging Teeth.

Having attempted, in the foregoing pages, to give a fair view of the importance as well as of the present imperfect state of this operation in dental surgery, so useful when judiciously applied and skilfully performed, and so pernicious when performed, in the

usually imperfect manner ; I beg to state, that so far from agreeing with any previous author on this subject, and from considering the operation of stopping teeth as impracticable in any instance in which it is indicated, I deem it the imperious duty of the dentist to be so prepared for its proper performance, not only as it regards his scientific knowledge and surgical skill, but also with all the necessary mechanical means and materials, as never to be obliged to omit its recommendation and performance on the ground of any inconvenience or difficulty whatever.

In accordance with such principles, it will be necessary for me first, to point out, as far as possible, the means and materials properly adapted for stopping teeth, and next, to establish the circumstances which indicate the operation, and the principles and method for its proper performance.

Of the best Mechanical Implements for Stopping Teeth.

A skilful performance of this difficult operation depends in a great measure upon the extent and suitableness of the operator's instruments. The great variety of circumstances, under which the stopping of teeth is performed, renders a complete and appropriate set of instruments indispensably necessary to insure its full success.

When I began my practice, I was provided with those instruments only which are generally recommended, but I soon became aware of their imperfection, and I forthwith began and have since continued to improve and to extend them, in proportion as my experience and judgment became more mature.

The instruments which I have used for many years, and which have enabled me to encounter and overcome difficulties, apparently insurmountable, have been continually varied and improved as circumstances arose in the course of my experience to render such alterations and improvements necessary ; and without these exertions I should not have been enabled to perform this operation in every necessary instance.

I have so much altered the implements of this part of the art, from those generally used and known, that I am well aware of the impossibility to give a verbal description of my present apparatus, sufficiently distinct to be of any extensive use to the profession ; and inasmuch as they are intended to meet various difficulties, they greatly differ from each other in form, and are so numerous, that a proper description of them would occupy so much space, and require so many engravings, as would render this work too voluminous and expensive.

On looking over my cases of instruments, while preparing this chapter, I find for this operation alone more than one hundred and seventy separate implements ready for use ; not to add, that I am

always provided with some particular mechanical tools, with which I can, at any time, modify certain instruments, with a view to adapt them for uncommon cases with very little delay.

Of the Material best calculated for Stopping Teeth.

From what has been already stated, it is sufficiently clear that of all the materials generally used for this operation, no other is properly adapted for it than gold, perfectly free from alloy, and otherwise well prepared for the purpose.

To insure the possession of such a material, I have, for a considerable time, taken great care to submit the gold intended for my use to a chemical process under my own inspection, by which the smallest portion of any alloy, either of copper or of silver, is extracted before its preparation is completed.

The gold for stopping teeth is prepared in the form of leaves, much like those used by the gilder in appearance. They should, however, be always considerably thicker; and the dentist should be provided with leaves of various degrees of thickness, in order to choose and adopt the stopping according to different circumstances. I generally keep about six different degrees of thickness of the gold leaves in my possession. This metal thus prepared is the most suitable material for this operation; it is the softest and most malleable metal; it will never corrode, and it produces the most beautiful effect upon the appearance of the tooth stopped with it, so much so, indeed, that a front tooth, which is properly plugged in such a manner that the gold is not seen, is actually improved, not less in appearance than in health.

In fact, gold is the only material, the durability of which can be depended upon, and which combines all the advantages required for the due performance and success of this difficult and important operation. If, for instance, carious teeth are plugged with pure gold, the experienced eye of a judicious dentist can ascertain, at the first glance, whether the operation shall have been performed conformably to the fundamental principles of the art; whether a cure of the caries has been effected, and whether the tooth may not be still suffering from the least remains or relapse of the disease.

In Philadelphia I have frequently been able to distinguish my own operations from those of every other operator, and sometimes even to state the name of each dentist who had performed any operation of the kind on the same subject, whose teeth had been, at separate periods, under the management of two or three different dentists, whose modes of practice were known to me.

Since the second year of my practice I have used no other metal than the purest gold for this operation; of which the great expense, although a heavy tax on the dentist, should never be a

matter of consideration, if it cannot be denied that it is the only proper material for plugging teeth. And it may be hoped that the time has gone by, when these operations so conducive to health and cleanliness should be influenced by an ill judged parsimony.

Certainly it might be expected, that even those who move in the most humble circles of civilized life, would prefer expending this precious metal to remedy what is equally pernicious to themselves and disgusting to others, rather than load themselves with costly jewels and trinkets which can only exhibit their economy in a more unfortunate and injudicious point of view.

The celebrated Roman matron, proudly boasted that her children were her only jewels; and youth and beauty may, indeed, in the same manner, be most proud of a sound set of teeth, which at once communicate the idea of health and cleanliness far superior to the choicest pearls and most costly trinkets.

Of the indications for the operation of Stopping Teeth.

The great variety and indistinctness of the symptoms of caries render it rather difficult to give an exact description of them; and although this operation is as frequently indicated as any in dental surgery, yet it is far from being a sovereign remedy for every decayed tooth, as it seems to be considered by many injudicious practitioners, as well as by a great portion of the public.

Nothing can be more inconsistent with sound judgment, than the attempt of stopping stumps and roots of teeth, and such teeth as are in a state of putrefaction, or labouring under primary inflammation or suppuration in the lining membrane.

In every instance where the disease has completed its work of destruction, or has advanced to such extent as to be incurable by the combined efforts of art and nature, the tooth is no longer capable of preservation, and it must therefore be extracted.

We know, on the other hand, that caries in the teeth is a malady which cannot be arrested or cured by nature alone; but must always end in the destruction of the tooth affected, if art does not interfere to effect a principal part of the cure.

All carious teeth, therefore, in which the disease has not advanced to that extent, and present no other indication which urges their removal, possess the greatest claim upon the dental surgeon, for their cure and permanent preservation.

The operation of stopping such teeth, is one of the principal curative means in the hands of the dental surgeon. There are, however, other remedies, also, of equal efficacy if judiciously applied. Such are, filing, and cutting, or the complete removal of the diseased parts of the bony structure by the file, or other suitable cutting instruments, so as to produce a regular and plain sound surface of the tooth by which its health is preserved.

In many instances, there is no small difficulty to decide which treatment is most indicated, and most preferable for the cure of the disease; and, as it is not in my power to treat particularly of the operation of filing or cutting away the caries, at present, it may not be amiss to make a few remarks here on these remedies, so far, at least, as it may facilitate the decision upon the adoption of either of these operations.

In treating on caries, I have already stated as the best general rule for the treatment of that disease in its simple state, to extirpate all the carious parts and to stop the cavities produced by deep-seated caries, and also such as are produced by superficial caries, when the disease has penetrated more than one-third of that side of the bony structure of the tooth.

If, however, the external caries should extend over a large and broad surface of the tooth, without having entered very deeply into the bony structure, or if the cavity occupies only about one-third of the affected side of the tooth, it should be removed with the file or cutter. This last rule, however, is subject to many exceptions, and the indication of these exceptions can only be ascertained by experience, and by a minute consideration of all the circumstances making for or against either treatment, viz. the nature of the constitution, and the greater or less predisposition to that disease in the teeth; the situation of the disease in the tooth; the various forms of the teeth; the form of the individual tooth affected; and the particular appearance of the decayed part.

It is owing to the frequent absence of the necessary judgment for the operation of filing, and to the great difficulties incident to this remedy, that it proves so frequently unsuccessful and destructive in its effects: and hence the unjust and injurious prejudice so extensively prevailing against the filing of teeth.

When the front teeth of an individual of delicate health, for instance, are filed instead of their cavities being stopped, when the latter operation is properly indicated, the surface of the bone, thus exposed, is rendered the more tender the nearer it approaches the nerve of the tooth; and, moreover, if the local causes of the different diseases of the mouth have not been previously completely eradicated, as they generally are not, these teeth will decay again, and the sooner on account of the operation; and the substance which might have received and retained a plug being thus removed, that operation is rendered impracticable, and the teeth are irretrievably lost.

Or, if appearances mislead an incompetent operator into a notion that the disease is superficial when it is actually very deep, and approaching towards the lining membrane, and he should determine to use the file, the tooth is inevitably ruined by such a pro-

cedure: because, if all the caries be removed, the nerve of the tooth will not be sufficiently protected, and it will even sometimes be exposed; and if it be not completely removed, the disease will remain: and being aggravated by the filing, it will become more active than ever in its destructive progress. In such a case, no beneficial results can possibly arise from the operation of filing, while, on the contrary, the irritation and exposure are sure to cause an inflammation of the lining membrane, and consequent destruction of the tooth.

But these injurious consequences, which are very unjustly attributed to a remedy of great efficacy and value when properly used, should be charged to the want of skill and judgment of the operator and its misapplication.

To guard against these mistakes and to prevent these ill consequences of the operation of filing and cutting away the caries, when injudiciously adopted, if any doubt should arise in the mind of the operator on the extent of the decay, he should pursue such treatment as, if he should be mistaken, will leave him an opportunity of adopting either of the operations: that is, he should first extirpate all the decayed and diseased parts of the bone, and then decide whether it might be best to file away the whole surface to the same depth, or to fill the cavity with gold.

This temporizing practice will, however, take twice the time, and produce much more irritation than a decided manner of operating: but it is the safest way for him who is in doubt.

These operations, however, do not cure any primary affection of the lining membrane, nor the actual tooth-ache, as is frequently supposed by such as are unacquainted with the subject; on the contrary, the filing or cutting, as well as the stopping, under such circumstances, instead of affording any relief or protection to the affected parts, would, by its pressure or irritation augment the disease, and consequently the painful symptoms; and it would also destroy the vitality of the membrane, and thus become the direct cause of the loss of the tooth.

Either of these operations are certain remedies only when properly employed, and when the caries has not penetrated through the whole bony structure of the tooth, and has consequently left a sufficient portion of the bone in a sound state, for the protection of the nerve.

It is not, however, to be supposed that the preservation of all such teeth is impossible of which the nerve is affected, or in which the caries has arrived at its complicated state.

If the disease has advanced to this form, although no other remedy than that of stopping the carious cavity can permanently preserve the vitality of the tooth, yet this operation is calculated for the cure of this state of caries as a second part of the remedy

only. The lining membrane of the tooth requires the first attention of the dentist, and on the proper treatment of this part depends the immediate preservation of the health and vitality of both the soft and hard structures of the tooth; whilst the stopping in reality forms but an artificial substitute for that part of the bony structure which has been destroyed by the disease, and a future protection of the lining membrane.

To this treatment of the lining membrane of the teeth when exposed or affected, I shall devote the following chapter; in which it will be seen that, by a proper previous treatment of this delicate structure, it is capable in many instances of being restored to health and preserved; this cure, however, in such cases, is effected by the previous treatment, and not by the stopping of the cavity.

Of the principles of the operation of Stopping Teeth with gold.

The great sympathy existing between the teeth, their relative parts, and the system generally, must be evident to every scientific and experienced dentist. It is, however, more especially indicated in the appearance of the teeth during the presence of general fever; and on such occasions it may be frequently made known to the patient, by a peculiar sensation of tenderness or soreness in the teeth and periosteum.

The feelings of the individual, however, are not always a certain criterion. Chronic inflammation of the bony structure of the teeth, and the other parts, are not always accompanied by this sensation in the mouth. The teeth may sometimes perform all their usual functions without creating any remarkable inconvenience, and yet without being in a state to bear this operation, which might not only produce considerable pain at the time, but prove unsuccessful and injurious, from the great probability there might be of its producing inflammation in the lining membrane and the periosteum, and of its thus destroying the vitality of the tooth.

To render the operation of stopping carious teeth certain in its success, it is necessary, therefore, that the tooth to be stopped should be previously perfectly freed from all symptomatic inflammation of either the lining membrane or bony structure.

General fever, even of the slightest kind, such as accompanies a cold or cough, should be considered as a sufficient cause for delaying the operation; and it should never be attempted except when the individual enjoys his usual good health.

To remove every local exciting cause of inflammation, especially every disease of the mouth that might be considered the principal exciting cause of the local maladies of the teeth, should be deemed as the next essential and indispensable duty devolving

upon the dentist, before he could properly undertake the operation of plugging the affected tooth.

When the parts in immediate connexion with the teeth, such as the gums, the alveoli, the periosteum, and maxillary bones, and even those more distant, are in any way morbidly affected, they should therefore be previously restored to their healthy action.

For more than thirteen years have I made it an invariable rule in my own practice, not to stop teeth until I have completely cured all the diseases of the gums, the periosteum, alveoli, and maxillary bones; by using this precaution, I have seldom failed to be completely successful in the application of this remedy.

By scrupulous attention to these fundamental principles of previous treatment, the operation is attended with very little pain, notwithstanding the great pressure which is sometimes required to be applied, both for cutting away the caries, and for plugging or filling up the cavity in a durable manner. In fact, this remedy should never be attended with great pain, as that would be a proof that the operation was untimely, or that some part of the process of it was improperly performed.

Of the manner in which the operation of Stopping the Teeth should be performed.

The operation of stopping teeth may be divided into two parts, viz. the curative, and the preventive parts of the treatment.

The first consists in the perfect and judicious extirpation of the bony abscess, the caries, by which only the disease can be radically cured: and the second is the proper stopping of the cavity, on which the permanency of the cure altogether depends, and by which the relapse of the disease is prevented.

By the extirpation of the dead and diseased parts, the tooth is rendered sound but remains defective: and, as the cavity is incapable of being filled up by any regenerative process of nature, it becomes a reservoir for the accumulation of corrosive matter, whilst the nerve is left insufficiently protected after the extirpation of the caries, and having lost a portion of its strength, it is placed in a state to require further treatment, to prevent a relapse of the disease.

This treatment, the filling up of the cavity, by an artificial substitute in order to remedy the defect, is the second part of the operation, by which the following three great objects are attained, viz. security against any accumulation of corrosive matter in the hollow of the tooth; the protection of its lining membrane; and the restoration, in a great measure, of the former health and strength of its bony structure.

In performing the first part of the operation, great care should be taken to cut away all the affected bony structure; that is, not

only such as is brown, or has a darker appearance than the rest, but also every other part that is not white, and possessed of vitality and perfect health.

The disease sometimes extends itself in different directions from the centre. All such parts must be entirely removed; for if any portion affected with caries, though it might be no larger than a grain of sand, be left in the cavity, a permanent cure cannot be accomplished, as the disease will remain, and ultimately destroy the life of the nerve.

In the different stages of complicated caries, the lining membrane is covered only by such dead part of the bony structure as is always destructive to this membrane, and is either hard and not corroded, or soft and in a putrid state: sometimes even the nerve itself is partially exposed. In such cases inflammation of the lining membrane will unavoidably ensue; and a cure of the disease is impossible, unless the carious matter is entirely removed.

At such an advanced stage of the disease, the nerve must be laid bare, and treated so as to remove any slight irritation and to arrest the bleeding if it should be wounded; and to prevent such future irritation as might produce inflammation. The particulars of this treatment will be stated in the next chapter.

The final consideration in the management of this part of the operation is, to take great care to give the cavity a proper form in order to retain the metal. For this purpose it should be round or oval, entirely smooth, and free from ragged edges; and, before the metal is placed in the tooth, the cavity should be carefully washed out with locks of cotton dipped in warm water, and afterwards completely dried in the same manner, by repeated use of dry locks of the same substance.

In performing the second part of the operation, the stopping of the tooth, the metal should be firmly pressed into the cavity, and rendered as compact as if it were solid metal, so that nothing could by possibility penetrate through it. The operation is then to be completed in the following manner. The redundant metal is to be cut away, and the plug perfectly smoothed and polished by some burnishing instrument.

If every necessary attention is paid to all the above indications, it may be confidently expected, that, in most instances, the lining membrane will be preserved from exposure for half a century and upwards.

In those cases in which the teeth are to be stopped on their grinding surfaces, or on their internal or external sides, the operation is to be performed in the way already mentioned; but when the caries is situated on that side which is next to the adjoining tooth, a division must be previously made with a file between these teeth, in an oblique direction towards the neck of the tooth,

so as to admit the instruments necessary for the extirpation of the caries, and the filling of the cavity.

Although all teeth are more or less subject to become diseased in these places, the incisors and cuspidati most frequently require this treatment. In these teeth it is a matter of great importance, that the stopping should be so placed as not to be visible. To accomplish this object, a small division should be made with a thin file, between the tooth affected and its adjoining neighbour in an oblique direction towards the posterior surface of the tooth, so as to obtain a regular and smooth surface, and also sufficient room to allow of the caries being perfectly extirpated, and the cavity filled with gold from behind the tooth.

Moreover, great care should be taken that as little as possible of the tooth be filed away from the sides, and that its natural form should be preserved. The advantages arising from these particular cautions are also of great importance. The teeth are stronger, the more lateral bony structure is preserved, and they will also endure a greater pressure in stopping them, so that the gold may be more firmly and more compactly fitted to the cavity, which also may thus admit of being made deeper, and better adapted for the reception of the gold; while the appearance, in the meantime, is not a little benefitted by the preservation of a more natural form of the tooth.

These objects are always attended with great difficulty, and the success of the operation greatly depends on the dexterity and skill of the dental surgeon.

For the extirpation of the caries, and the insertion of the gold into a cavity on the grinding surfaces of the molar teeth, the usual instruments for this operation will be found sufficient in very few instances only; and generally they will not suffice even in the most convenient cases, without the improved forms and modifications which I have given them. But when the cavity is situated upon any of the lateral parts or sides of the teeth, these instruments are wholly inadequate. The carious matter cannot be perfectly removed and consequently no cure of the disease can be effected. The gold cannot be properly inserted into the cavity, for if sufficient power be applied to press in the metal with the stopper as firmly as is necessary, it will inevitably loosen the tooth, or produce inflammation in the periosteum; and on the other hand, if, to avoid this effect, less than sufficient strength be applied in pressing in the metal, the loose plugging will be the cause of injury, from its allowing the introduction of foreign matter.

To avoid both these evils, it is necessary to be provided with instruments so contrived as to enable the operator to effect a counter pressure, proportional to that directly applied; so that whatever may be the force directed to one side, it is resisted by an adequate counter force on the other.

The inconveniences and difficulties attending this operation are so numerous, and of so various a nature, that it is quite impossible to give any particular description of them, or such directions as will meet every case. All that can be done is to establish some general principle for this difficult operation, and its execution must be left to the judgment and skill of the operating surgeon.

Sometimes the slightest difference in the situation or formation of the caries, or in the direction, situation or form of the tooth, is sufficient to produce great difficulty, and is found to require a great difference in the form and strength of the requisite apparatus. Should the decay for instance be situated, on the anterior side of one of the molar or bicuspid teeth, there will be no great difficulty in completing the operation after their division shall have been made; but if it be seated on the posterior surface, the difficulties arising from the situation are so great, that they appear quite insurmountable: yet they are never so in reality, and only require more dexterity and experience and a greater variety of instruments for their removal.

I have frequently stopped the dentes sapientæ in two or three different places; and, in a few instances, I have performed the operation on the posterior part of one of these teeth; indeed, in one instance, I filed and cut away the caries in two places, and extirpated the caries from five cavities, and plugged them with gold, in the same tooth, the particulars of which I beg to relate before I conclude this article.

CASE XLI.

Before I left the United States of America, I had occasion to examine the teeth of Mrs. B. of Philadelphia, who had been under my care seven years before. The caries had been filed and cut away from many of her teeth at that time, with a view to preserve them, and more than twenty cavities had been filled with gold.

The upper cuspidati had been both filed and stopped, and the lining membrane had been exposed and treated in the manner to be stated hereafter, previously to the introduction of the gold.

The lady had lost all her large grinders, the second large molares in the upper and under jaw on the right side, and the first on the under left side excepted. These molar teeth were become very precious in consequence of the loss of the others, and all of them were plugged in different places. The under second large grinder on the right side being rendered of the greatest importance by the above circumstances, was filed in two places, and had five cavities stopped with gold.

I had the gratification to find every tooth in complete order, and her whole mouth after the most minute examination, in perfect health. All the teeth were clean, white, and beautiful, none of the

stoppings in the front teeth were visible, except on a close and very particular inspection; the filed surfaces were perfectly white and sound, and the stoppings remained as firm and solid in their cavities as if they had been introduced on the same day.

For seven years no operation had been performed upon her teeth. The lady, however, had been constantly supplied with proper tooth powder and brushes, and with particular directions for their use, in order to preserve the perfect health and cleanliness of her mouth and teeth.

CHAPTER VII.

OF THE SURGICAL TREATMENT OF THE LINING MEMBRANE, OR NERVE OF THE TEETH, WHEN EXPOSED, PREVIOUS TO STOPPING THE CAVITY WITH GOLD.

By adopting the mode and principles stated in the foregoing chapter, for the operation of stopping carious teeth, it will frequently occur during the performance of the first or surgical part of the treatment that the nerve of the tooth, together with its accompanying artery and vein, is laid bare, and sometimes, also, that it is wounded.

In every case of complicated caries, when the disease has penetrated the whole bony structure of the affected side of the tooth, the exposure of the lining membrane is an unavoidable consequence, and necessary for the restoration of healthy action in this membrane, and for the permanent preservation of the diseased tooth.

It is not always possible to ascertain the exact stage of the disease, in consequence of the great variety of its symptoms and appearances; and the extent of it is, indeed, frequently not distinctly discovered until the necessary treatment has been, to a certain extent, completed.

If the caries has been left to itself, the symptoms of the disease generally proceed so regularly that the state of it may readily be detected by inspection; but in cases which have been aggravated by dental operations injudiciously performed, such as filing, cutting, or stopping, a diseased state is kept up, which may not unfrequently deceive both the patient and the dentist.

In most instances of this kind, the disease will be found to present a great variety of symptoms and appearances.

Stopping of the teeth in particular, when improperly performed, will be found frequently to operate as an accelerating cause of complicated caries, and will consequently be productive of effects

subversive of the intention of this operation; and the injudicious performance of the operation of filing or cutting, being calculated rather to excite than to remove the caries, is also frequently a cause of great injury; besides, it will often be found that the sound lateral parts of the bony structure, which are requisite for the reception of the metal in stopping, have been injudiciously cut or filed away; by which the exposure of the nerve is rendered unavoidable from the necessity of giving the cavity a sufficient depth for the reception and permanent retention of the gold.

The latter malpractice is of not less frequent occurrence than the former, and is more to be dreaded, because it is most frequently applied to such teeth as are most important. And I may justly assert, that in almost every case in which the operation has been performed upon those sides of the incisors, eye teeth, and small grinders, which are in contact with each other, I have had the mortification to see this useful operation abused in the above manner. See cases 7, 14, 42, and 44.

Every tooth affected in this way, either by disease or maltreatment, will be sooner or later inevitably destroyed, if not prevented by the treatment stated hereafter; and, if it presents sufficient indications for its preservation, every exertion should be made for that purpose.

This is, indeed, often an object of great importance. If, for instance, the incisors and cuspidati, or other teeth particularly necessary for appearance, pronunciation, or mastication, are affected with complicated caries; so long as their lining membrane is not yet in a state of suppuration, or deprived of its vitality, their preservation is almost invariably indicated; and should be preferred to such teeth as, although perfectly sound, possess not the same advantages.

In all cases where the exposure of the lining membrane of a tooth is owing to an unskilful manner of extirpating the carious matter, on the part of the dental operator, the patient's situation is truly deplorable; as the preservation of his teeth can be effected under these circumstances only by such treatment as requires particular judgment and skill.

Of the common method of treating the Nerve in an exposed state.

The remedies with which dental surgery had supplied us in these cases appeared to me at the commencement of my practice both cruel and contrary to reason.

All the authors I have yet been able to consult on this subject, from the time of Hippocrates down to the present age, unanimously concur in recommending, in these cases, the destruction of the nerve of the tooth and its investing membrane. They advise, for this purpose, the knife, concentrated acids, and especially the actual cautery.

I trust that in treating of caries I have sufficiently demonstrated the morbid effects of such destructive operations upon the other teeth, and the other parts of the mouth connected with the teeth, as also upon the general constitution.

The pain caused by the operation of destroying the nerve is so intense and protracted, and even the idea of it is so distressing, that few patients are willing to submit to this remedy. The bare consideration, however, of its producing very great pain and of its appearing very appalling to the patient, would not in itself be a sufficient ground for its rejection, if any hope of ultimate success could be entertained.

It ought to be the assiduous study, as it is certainly the most important duty of the humane dentist, to overcome these, like other difficulties, by calming the fears of the patient, and inspiring him with that confidence and submission which can be effected only by skill, gentle persuasion and tenderness; but there are other circumstances which render the adoption of this mode of treatment objectionable.

A tooth, which has been deprived of its vitality by the destruction of its nerve, acts upon the parts, with which it is in immediate contact, as a dead and foreign body. It produces all the evil effects which are usually the consequences of the dead root of a tooth but in a much greater degree.

From the moment a tooth is deprived of life, it becomes a useless and intrusive part of the animal economy, and causes an irritation with which the whole constitution sympathises. In the beginning, the suppuration at the root of a tooth exists in the fasciculus of the nerve and extends afterwards to the cord. The progress of the disease opens a way for the discharge of the matter through the canal of the root.

If, therefore, a tooth which has been treated after the above plan be filled up with metal, the natural opening for the discharge of the matter is thereby obstructed, and the pus, being confined and accumulated, works its way through the side of the socket, and produces a fistulous opening, by which the morbid effects of such a tooth are rendered much more extensive and complicated than the dead tooth that has been left to itself.

In the delicate and irritable subject, the violent irritation which is created by this unnatural operation in the whole nervous system, but more especially in the adjoining nerves and parts, frequently occasions an inflammation of the whole mouth, which soon concentrates upon the parts near the affected tooth, where tumefaction and suppuration take place. The pus being discharged from the swelled gums, the patient may obtain some relief, but a perfect cure is not accomplished. This can be effected only by the extraction of the tooth; an operation to which the patient soon flies for relief.

In strong and firm constitutions, however, when this operation of destroying the nerve is performed with neatness and dexterity, although these evil consequences occasionally appear, even with much violence and acuteness, yet they do not generally shew themselves at an early period.

In such cases, after the matter has been evacuated, the tumour disappears nearly altogether, leaving nothing behind it but a slight hardness. Through this small indurated spot, the matter, which usually collects at the point of the root, works its passage outward through the thinnest side of the socket, and is constantly discharged.

In addition to the irritation produced by the morbid state of the part upon the nervous system, and the constant discharge of pus, a portion of the matter, collected at the root, is absorbed, and, by irritating the glands, destroys the healthy secretions of the mouth which also act as a cause of irritation both upon the other teeth, and upon the stomach, and through this organ upon the whole system.

I have sometimes known a single tooth, which has been treated in this manner, become the cause of general disorder to the system and to all the other teeth in the mouth; of which the following case affords a striking example.

CASE XLII.

On the 22nd May, 1818, I was consulted by Mr. N. of Philadelphia, on the subject of his teeth. He informed me that about fourteen months previously, he had put himself under the care of a dentist, who, on cutting away the carious parts of the left cuspid, exposed the nerve of the tooth, which he immediately destroyed by the application of the actual cautery. The pain occasioned by this was so acute that the dentist could not, conformably to his original intention proceed to fill up the cavity with gold, but was obliged to defer this part of the operation and requested the patient to return to him again in five days.

A violent inflammation and swelling of the gums supervened, which prevented the completion of the operation at the time the patient was requested to return. He was directed to use emollient washes, &c. for his mouth, with a view to reduce the inflammation; but the swelling immediately around the tooth increased, and became highly painful; it soon, however, broke and discharged a considerable quantity of pus. The pain was now much mitigated, and the patient expected soon to be able to bear the operation of plugging his tooth. The swelling, however, did not wholly subside; the tooth was loose and extremely tender to the touch.

Four weeks after the nerve had been destroyed, it was still thought improper to proceed with the operation, and the patient was consoled by his dentist with the hope that the inflammation and swelling would not continue long, and that he would soon be in a proper state to have the operation finished.

In this hope, however, he was disappointed. The tooth remained extremely painful; the swelling of the gums increased, and again terminated in suppuration. After having thus suffered for about five months he became dissatisfied with his dentist, lost all confidence in the resources of art, and determined to rely for relief on the sanative efforts of nature.

Continued pain and distress soon obliged him to abandon this resolution, and again to apply to art for aid. Having now consulted me, I found his mouth in a most painful and diseased state. The eye tooth, whose nerve had been destroyed by the actual cautery, was loose, and so painful that the slightest pressure of the finger caused great pain to the patient. Its socket was greatly enlarged, and the inflammation had extended to the periosteum of all the sockets of the upper jaw, which were also enlarged in proportion to their proximity to the dead tooth. The parts were altered from their natural direction; so that the teeth adjoining the dead one had separated from it on either side, and, having been pushed forwards, the mouth was greatly disfigured.

The teeth that had been filed were again affected with caries, which was now proceeding more rapidly than before they were filed.

There was much tartar on all the teeth, but more especially on those which were dead, and those immediately adjoining. The gums were greatly inflamed, much swelled and spongy and upon the slightest pressure of the finger, they poured out a mixture of black blood and foetid pus. The breath was very offensive; the face was pale and emaciated; although the constitution was naturally very healthy and strong.

The patient readily submitted to the plan of treatment I proposed to him; which consisted

1. In removing the inflammation of the bony structure of the jaw: this I effected in part by the removal of the irritating causes, viz. the dead tooth and the two diseased molares.

2. The removal of the inflammation and suppuration of the periosteum and gums. With this view, I carefully removed the tartar from the teeth, and directed the use of a mild stimulating wash for the mouth, and the subsequent careful cleansing of the teeth.

In three months afterwards, I found my patient sufficiently well to admit of my treating the individual disorders of his teeth with perfect safety; and by the other necessary operations on these, he

had the satisfaction of recovering not only the health of his teeth and mouth, but also that of the general system in a short time.

Of the author's method of treating the lining membrane of the tooth when exposed.

The judicious reader, I trust, will be convinced by what I have already said, of the impropriety of destroying the nerve of the tooth by any operation, and that it is a practice which ought to be altogether discarded from dental surgery.

I hope I may now be permitted to detail my own method of operating, in cases where the nerve of the tooth has become exposed, which I have practised for upwards of thirteen years, with much satisfaction and success.

The only rational mode of restoring to health, and of preserving such teeth as are suffering from complicated caries, in which the lining membrane has been exposed, is the restoration and preservation of the health and the life of this important part of the tooth. To obtain this object, after the removal of every other cause of symptomatic inflammation, whether of the hard or of the soft parts of the mouth, and of the structure of the teeth, has been accomplished in the manner and on the principles stated in the article on the general treatment of the diseases of the teeth &c. and, on the stopping of the teeth; I have adopted the following local treatment, which I have found to be the only one calculated to insure success, namely:

1. To put a stop to the caries, and consequently to prevent the irritation upon the internal membrane of the tooth.

2. To suppress the hæmorrhage, and to cure the wound of the membrane if it be wounded.

3. To protect the membrane artificially against the action of all foreign agents.

The first of these objects is to be obtained by the surgical preparation for stopping teeth, and as explained in the foregoing chapter. I need only add, that the extirpation of the caries should be performed with the utmost care, and with as little irritation to the nerve as possible; taking care also not to wound the membrane, if this can be avoided.

In performing this part of the operation, I have always been particularly careful to give the cavity the best possible form for the reception of the metal, and for its firm retention. I next wash it out with a little lock of cotton, fastened to a straight elastic probe, dipped in warm water. The cavity must be very carefully freed from small pieces, and even from the dust of bone that may adhere to its surface.

If the lining membrane is not wounded, I immediately plug the cavity with metal, and finish the operation in the manner to be mentioned hereafter.

But if the membrane should be wounded and the operation be followed by hæmorrhage, I resort to the treatment for the second indication, viz. to put an immediate stop to the bleeding, and to effect the healing of the wound.

For this purpose, I was, for sometime, at the commencement of my practice, in the habit of applying weak acids and styptics. These applications, however, did not often succeed. The former act destructively on the surrounding parts, and the latter could not be depended on in the operation. I therefore soon abandoned these means, and resorted to the actual cautery. By this application I effect an artificial contraction of the wound, and consequently a stoppage of the hæmorrhage.

I require for this the following apparatus: 1. A small iron wire, fastened to an ivory handle. The extremity of this wire I file to the size of the exposed surface of the nerve, and bend the wire in such a direction as to enable me to touch the exposed part of the membrane, without touching any other part of the tooth or the mouth. 2. A thick tallow candle, with a large wick.

I direct the patient to discharge all the saliva he may have in his mouth, and then to incline his head backwards against the head support of my operating chair. I put the candle into his left hand, and direct him to hold it in such a position that the flame of it may be on a level with his mouth, and about eight inches from it; I now place myself on the right side of the patient, and, holding his lips sufficiently open with my left hand, to prevent the instrument from touching them, I again dry the cavity as perfectly as possible with a lock of cotton fastened to the point of the cauterizing wire. Having effected this, I throw away the cotton from the extremity of the wire, and make it red hot in the flame of the candle. With the wire thus heated, I touch the exposed part very rapidly, so that its surface contracts, without, however, suffering it to penetrate deeply into the nerve, or to touch any part of the bony structure; as this would inevitably bring on suppuration and destruction of the whole lining membrane. The bleeding spot must be touched very quickly with the hot wire, which is sometimes necessary to be repeated two or three times before the parts are sufficiently contracted. The wire should be perfectly red hot, for in this state the cautery acts suddenly, and almost entirely without pain; but when heated to any temperature short of that of red heat, much pain and inflammation are generally produced. This operation is, indeed, so slightly painful, that I have been solicited by my patients to repeat it, although they had required much persuasion to induce them in the first instance to suffer its application. It, however, must be performed very adroitly, and without any loss of time. To prevent the flow of saliva to interfere, the patient must be desired not

to close his lips, but to keep his mouth wide open, until the whole of the operation is finished, which he is capable to do for a certain time only.

When the hæmorrhage has been arrested in this way, and an artificial cicatrix formed, I wash the cavity, as before the cauterization, with warm water. I carefully remove every particle of the ashes or matter that may have been left by the cauterization, taking great care not to wound the membrane again.

The nerve, which, before cauterization, had a fleshy appearance, is, after this operation, like a black point. I take care not to disturb this point, for if the black scar be removed, a new wound will be formed and bleeding again will ensue; but I leave the future healing altogether to nature, and only caution my patient against using such things as might interfere with its salutary operations.

Having thus far removed all possible cause of future disease and irritation, in order to prevent any unnecessary exposure of the nerve, by which inflammation and destruction of it might be produced, I now terminate the operation by fulfilling the third indication, that is, to protect the nerve against injurious impressions from without, by filling up the cavity of the tooth with metal. Having again perfectly dried the cavity, I now take a small plate of very thin lead leaf, and lay it upon the exposed nerve, and on the immediately surrounding bony parts. I next carefully fill up the whole cavity with gold. The dressing of the cavity and the firm insertion of the two different metals also, must be completed before the patient can be allowed to close his mouth which is not unfrequently very difficult.

In order that complete success may attend this operation, it is absolutely necessary that all its parts should be performed with the utmost degree of exactness and care, since the smallest error will inevitably cause a destruction of the life, and consequent loss of the tooth.

The whole operation, will prove abortive if the smallest particle of dead matter or inflamed bony substance is suffered to remain in the cavity. Such foreign dead matter left in contact with the living tooth, soon acquires corrosive qualities, and acts destructively upon the contiguous parts by irritating and inflaming them. The smallest quantity of blood left in the cavity soon becomes corrosive, and prevents the success of the operation. All kinds of moisture even must be removed, before introducing the metals, as the two contiguous metals might produce galvanic effects if there be an any intervening fluid and thus create a source of irritation and inflammation in the nerve.

When the cavity is once completely cleared of the loose particles of matter and made perfectly dry, the metal should be quickly in-

roduced, before the cavity becomes moist again from the natural exhalations in the mouth. The gold should of course be firmly and completely pressed into the cavity, in order to prevent the insinuation of any moisture after the operation.

In the whole of the performance of this operation the skill of the operator is of the highest importance; for if he has been successful in the difficult task of preserving the life of the nerve, the permanent preservation of the tooth depends equally on the skilful manner in which it is plugged with the two different metals, and the whole process is one of those by which one dentist may have an opportunity of proving his great superiority over another.

It may be asked why I cover the nerve with lead. I do so, because I believe this metal has a cooling and anti-inflammatory effect upon the irritated nerve of the tooth, at least it possesses these qualities in a greater degree than gold.

When, in the commencement of my practice, I employed gold exclusively, I was seldom successful in my labours, for inflammation, pain, &c. generally came on obliged me in a short time to remove the tooth entirely. I therefore resorted to the use of tin-foil as an experiment, and with this metal my success was more frequent though not what I desired it to be; for when the operation succeeded with this metal, it did not, from its great liability to corrode, remain long a protection to the nerve.

In all cases where tin foil is used, the tooth is preserved but for a few years, for the saliva is dissolving and uniting with the metal may act even more destructively than the disease itself.

On recollecting the cases so generally known of leaden bullets even when rough and battered, having remained for years imbedded in the flesh, I was naturally induced to resort to the use of lead in this operation. I do not recollect to have heard that a case has been reported of any other metal remaining in the body for a long period, without exciting inflammation and suppuration in the surrounding parts. My experience has ever since strengthened the opinion I drew from these facts, and I am now more confident than ever that this substance is less irritating to living parts than any other metal. I have used the lead under gold in the above manner for many years, and I feel myself justified in saying that nothing is so well qualified for this operation. The following case is a striking illustration of this fact.

CASE XLIII.

Mr. B. a gentleman of Philadelphia, of considerable chemical information, consulted me about the disordered state of his teeth, and requested my exertions to restore them to perfect health.

The under first large grinder on the right side had been previously stopped in such an improper manner as was calculated to

increase the progress of the caries towards the nerve of the tooth. In consequence of this the disease had advanced to a considerable extent.

1816, March 15.—By the perfect extirpation of the caries from this tooth an immense cavity was produced, and the lining membrane inevitably exposed in two different places. The tooth was stopped, agreeably to the method just stated, with tin foil: the operation was not completely successful as the tooth remained tender.

Some time after, this gentleman established a manufactory for gold beating, and giving him an order for some gold leaf, I requested he would also furnish me with some leaves of pure lead; which he soon delivered, and also desired to have the advantage of it in the case of his own tooth, alluded to above, which still remained irritable and tender.

1817, July 21st.—Agreeably to his request, the plug was removed, and the lining membrane was found in a state of considerable irritation. It closely adhered to the tin foil, and by the removal of the latter, a quantity of blood, amounting to four or five drops, was discharged. The hæmorrhage was arrested, and the tooth stopped again in the manner described, with the lead and gold. It was thereby preserved alive, and has continued free from pain, and useful ever since.

1824, August 9th.—Mr. B. visited London on some business, and requested my attendance for the restoration of any such defects in the state of his teeth, as might be the effect of his sea voyage. They were made perfectly clean, and the tooth which had been stopped was found in a state of complete health, and very useful.

After the above treatment, it is requisite to attend carefully to the following circumstances:

1st. The prevention of inflammation of the lining membrane or nerve of the tooth; and, 2dly, if inflammation has supervened, to endeavour to prevent its terminating in suppuration.

To answer the first object, the patient must guard himself from imprudent exposure to the damp and cold air, or to any sudden transition from heat to cold, or *vice versa*; he must also keep his teeth clean, by the use of some suitable dentifrice, good brushes, and warm water.

If the general diathesis of the patient's constitution be inflammatory, it may be useful to bathe his gums with a mixture of equal parts of tincture of myrrh and warm water, every three or four hours. When the tooth becomes painful, I scarify the gums, and promote the bleeding by warm fomentations. After the bleeding has ceased, the washing the mouth with the above mixture, with the addition of a little honey, may be continued.

If the inflammation be in the gums, and the pain become considerable, I have frequently directed the application of two or three leeches to the gums, but I have seldom seen any benefit arise from this practice; for, although the pain has generally subsided, the inflammation mostly ended in chronic suppuration, and the loss of vitality of the lining membrane. I have, therefore, abandoned this practice for many years, and have since only endeavoured to prevent any derangement in the *primæ viæ*, by requesting the individual to be attentive to the regularity of his diet. In most instances of this kind, however, the judicious application of some local stimulant, such as, the tincture of myrrh, camphor, or opium, has proved the most useful for this purpose.

The dentist must not suffer himself to be induced by the complaints of the patient to remove the tooth at once when he might desire it. In many instances the pain ceases with the operation; but sometimes the tooth becomes occasionally painful during several months. As long as it possesses vitality there are hopes of a perfect cure.

Should it, however, be loose, and of a pale and unnatural colour, the gums red, swelled, suppurating, and painful, with ulcers and fistulous opening in the neighbourhood of the tooth, then we may conclude that the nerve is destroyed, and that the operation has failed. In this case it is best to extract the tooth without delay.

If the tooth, after about three months has a natural and lively colour, and is free from pain without being insensible or loose, then the cure may be pronounced as complete. The tooth is now secured as long as the metal remains firm in its cavity, and protects the nerve against the action of external agents.

In almost every case where a course of different operations is necessary for a perfect restoration of the teeth, we find one diseased tooth, sometimes more, which would require this treatment, and these are, most frequently, amongst the most important, viz. the incisors, cuspid and bicuspid, and sometimes also the molar teeth.

On an average, five out of six teeth may be preserved alive, and rendered useful for a long space of time by the above treatment.

In conclusion, I beg to draw the particular attention of the reader to cases 7, 14, 16, 17, 18, 19, 21, 22, 23, and to relate the following case as an illustration of my practice on this subject.

CASE XLIV.

Mr. O. of Philadelphia, a very respectable gentleman, consulted me on the subject of his teeth, which had been injudiciously treated some years before. Many of them had been filed and the caries

cut away, and others stopped. All were in some degree covered with tartar; and many of them were in a state of rapid decay.

1817, November 12.—The teeth were rendered perfectly clean by scaling and cleaning.

December 11.—Five teeth were again filed, the caries cut out from one of these, and the cavity plugged with gold. In the latter, the caries having penetrated into the cavity, the nerve was unavoidably exposed: it was, however, not wounded, and I treated it as has been before directed.

1818, March 26.—Four teeth were filed, and four had the caries extirpated, and were stopped with gold. In all the latter, the caries having penetrated into the cavity, the nerve was unavoidably exposed: it was, however, wounded in only one of them, and treated as has been stated above.

July 6.—Two teeth were filed and two plugged. Both of the latter presented difficulties similar to those before mentioned; and in both, the nerves being exposed and wounded, the same treatment was required.

August 29.—One of the teeth thus preserved became rather painful, and a small tumour formed over the fang: as this tooth, from its situation, was of no great utility, I considered it best to remove it, gaining thereby a greater prospect of success in the treatment of the others.

Thus it will be seen that in this case, of seven teeth with exposed nerves, treated according to the method above described, six are now preserved alive, healthy, and useful; namely, one upper central incisor, one cuspid, two bicuspid, one under bicuspid, and one molar. I have the pleasure to add, that my patient has enjoyed excellent health for many years.

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